# SUPPLEMENT.


# The Mining Journal,

## RAILWAY AND COMMERCIAL GAZETTE:

**FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.**

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## PRACTICAL MINING—PREPARING ORES FOR MARKET.

From the fact that even in the same district, and with equal facilities for earning profit, one manager will succeed in making an undertaking remunerative whilst another will report nothing but continued losses, it is evident that the discipline in the mine and the method of preparing the mineral for market must be of great effect. With regard to the latter Messrs. T. B. Jordan, Son, and Commans have designed a series of improved ore-reducing and continuous automatic dressing machinery for the treatment of copper, lead, and other ores, which is well worthy the attention of directors and others about to establish dressing-floors, or who are connected with undertakings where the dressing arrangements do not work satisfactorily. A medium-sized plant, fitted with the most modern and approved types of ore-crushing and dressing machinery, is capable of treating 20 to 30 tons of ore per day. The ore is first reduced by the stone-breaker, the whole produce of which passes through a trommel for the purpose of separating the finer particles, which are conveyed direct to the classifiers, the coarse produce of the breaker going to the picking table or direct to the crushing rolls. The crushing rolls roduce the ore to the required sizes, allowing its produce to fall into the elevator pit, from which it is raised to the trommel for further separation; the portion that is sufficiently fine passing down the launders to the classifiers, and the coarse residue returning to the rolls to be re-crushed. The classifiers separate the crushed ore into different sizes, each size passing to a jigger working at a suitable speed and stroke, and having suitable "bottoms;" the more perfect this classification or sizing the more effectively is the ore separated from its gangue. This separation takes place in the jiggers, which deposit the ore through the bottoms and sieves into the hutches, the gangue or waste being carried off over the surface by side outlets into trucks or pits.

The slimes are again classified, and pass to various forms of buddles or shaking tables, by which all the finest residue of the various processes are finally treated. Water under a slight head conveys the crushed ore through to the launders to the various machines described, and is allowed to pass away through settling pits, in these pits any metallic substance of value escaping the system of plant, will collect, and may from time to time be extracted and rebuddled. The stone-breakers are strong and massive, and, when necessary, are constructed in parts not weighing more than 3 to 4 cwts. for convenience of transport. The crushing-rolls are mounted on extra strong cast-iron framing, the shells being of the best cast-steel on extra hard white iron of equal hardness throughout, and so arranged that they are easily replaceable; all bearings have ample wearing surfaces, and the whole is constructed with a view to durability and stability. Messrs. T. B. Jordan, Son, and Commans's improved continuous jiggers are considered to embody important modifications, which render these machines perfectly automatic and sensitive in their action on material, the particles of which have the slightest variation in specific gravity; they are, therefore, capable or dressing ores up to a high percentage without waste. It is claimed that the arrangement of the plant renders it perfectly automatic, and the only attention required in the operation of it is that necessary to start the ore on its course by feeding the breaker, and to remove the finished product from the various hutches.

## BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE—No. IV.

In the Biology Section, Prof. E. Ray Lancaster delivered an address, which was chiefly remarkable for its length. It will suffice to record that in the course of it he remarked that in advocating the claim of biological science to a far greater measure of support than it receives at present from the public funds, he had endeavoured to press that claim chiefly on the ground of the obvious utility to the community of that kind of knowledge which is called biology. To opponents of the advancement of science, it is of little use to offer explanation and arguments. They mock at the botanist as a pedant, and the zoologist as a monomaniac; they execrate the physiologist as a monster of cruelty, and brand the geologist as a blasphemer; chemistry is held responsible for the abomination of aniline dyes and the pollution of rivers, and physics for the dirt and misery of great factory towns. By these unbelievers science is declared responsible for individual eccentricities of character, as well as for the sins of the commercial utilisers of new knowledge. The pursuit of science is said to produce a dearth of imagination, incapability of enjoying the beauty either of Nature or of art, scorn of literary culture, arrogance, irreverence, vanity, and the ambition of personal glorification. Such are the charges from time to time made by those who dislike science, and for such reasons they would withhold, and persuade others to withhold, the fair measure of support for scientific research which this country owes to the community of civilised states. Science is not a name applicable to any one branch of knowledge, but includes all knowledge which is of a certain order or scale of completeness. All knowledge which is deep enough to touch the causes of things is science; all enquiry into the causes of things is scientific enquiry. To aid in the production of new knowledge is the keenest and the purest pleasure of which man is capable. The progress and diffusion of scientific research, its encouragement and reverential nature, should be a chief business of the community, whether collectively or individually, at the present day.

In the Anthropology Department of the Biological Section, the Presiden, Mr. W. Pengelly, delivered an address, the object of which was to prove the superior antiquity of man from evidence supplied by Kent's Cavern and Brixham Hill Caves, and that, contrary to what was formerly the generally received opinion, man in this island was of older date than the hyena. Having reviewed the discoveries of Mr. MacEnery early in the present century, and the opinions of Dr. Buckland thereon, Mr. Pengelly said that a state of incredulity and apathy regarding man's antiquity lasted until 1858, when some workmen engaged in a limestone quarry on Windmill Hill, near Brixham, in South Devon, unexpectedly broke a hole through what proved to be the roof of an unknown cavern, which had been hermetically sealed during an incalculably long period, the last previous event in its history being the introduction of a reindeer antler found attached to the upper surface of the stalagmite floor. A committee was appointed to make an exploration of the cave, and at the end of 12 months they reported that eight flint tools had been found, all of them inosculating with bones of mammalia, at depths varying from 9 in. to 42 in. in the earth, on which lay a sheet of stalagmite from 3 in. to 8 in. thick, and having within and upon it relics of lion, hyena, bear, mammoth, rhinoceros, and reindeer. The results of these explorations had an enormous influence in impressing the scientific world generally with the value and importance of the geological evidence of man's antiquity. No trace of man was found in the breccia in Kent's Cavern until March, 1880, but at the close of the explorations it was discovered that the breccia had yielded upwards of 70 implements of flint and chert. All these stone tools were palæolithic, and were found inosculating with the remains of extinct mammals, but a cursory inspection showed them to belong to two distinct categories. The absence of the hyena from the breccia rendered it impossible to avoid the conclusion that the hyena was not an inhabitant of Britain during the earlier period, and that its existence here was posterior to that of man. From these and other facts disclosed Mr. Pengelly said there was little doubt that the earliest Devonians were either of glacial or pre-glacial age, and that the men who made the palæolithic nodule tools found in Kent's Cave existed during the pre-glacial continental period mentioned by Sir Charles Lyell.

In the Geography Section the consideration of the Himalayas, principally the western portion of the range, formed the subject of the address of the President, Lieut.-Col. H. Godwin-Austen. He considered the mountain chain with reference to its physical features, past and present, and consequently with reference to its geological history, so far as that related to the later tertiary times—*i.e.*, the period immediately preceding the present distribution of seas, land, rivers, and lakes. An object of the address was to point out and compare some of the physical features of the two great European and Asiatic chains and to contrast some of the great changes in the geography of Europe and of Asia. The leading facts brought out were that a fringing line of parallel ridges at the base of the Himalayas has been derived from them and that the sub-Himalayan formations are fresh water or torrential, while before the last great elevation of the Alpine chain the old line of sea coast ran up the long deep valleys, some of the peaks being higher by 5000 ft. than now.

The Territory of Arizona was referred to in some interesting notes by Mr. Litton Forbes, who pointed out that this territory was now practically opened up for the first time in its history by the completion of the new Atlantic and Pacific Railway. The port of Guaymas, on the Gulf of California, probably in the not far distant future will be the port of arrival at least for mails and passengers bound eastward from Australia, China, and Japan. At present Guaymas is a small Mexican town, consisting of adobe houses. Its harbour is excellent—one with deep water up to the very shore, and well sheltered from every wind. It is the only possible mail station on the Gulf of California, and is some 500 miles, or nearly two days' steaming, nearer Australia than San Francisco. Of all the western territories, Arizona has long been the most remote and inaccessible, and, therefore, the least known of all the territories. The aridity of the climate and the presence of hostile Apache Indians have had much to do with this. Arizona is a country of extraordinary mineral wealth. In many parts of its extensive territory it offers large tracts of excellent land to the farmer and the stock-raiser. Its chief drawback is a want of water, but this can be supplied by irrigation works and by artesian wells. Coal, salt, and the precious metals exist in larger quantities probably than in any of the western mining territories. The copper mines are even now the richest known. The area of the territory is about 114,900 square miles, or approximately 73,000,000 acres—in other words, three times the size of the State of New York. The general topography of the country is that of a plateau, sloping towards the south and west from an altitude of 7000 ft. to the sea level. The surface of Arizona is much diversified, and contains some of the finest scenery in North America. In no country in the world can the evidences of past geological action be better studied. The canon of the Colorado is a stupendous waterwork chasm, 400 miles long and ½ to 1½ mile in depth, and the scenery in many parts is grand and impressive.

The Hot Springs of Iceland and New Zealand formed the subject of a paper by Mr. T. Cuthbert Peek, who said that he had recently visited the hot springs of Iceland and New Zealand. Several most important differences were noticed in their composition. In the case of the hot mud wells of Iceland there is so much copper suspended in the mud that several companies have been started to work them commercially; while the mud springs of New Zealand are so full of infusoria that in times of famine the natives manage to sustain life on a diet chiefly consisting of mud. Some of the New Zealand springs contain a very large percentage of mineral, and the analysis of one of the most powerful was given. The hot springs of New Zealand appear to extend from Mount Tongariro to White Island. On April 25 Tongariro was observed to be giving out more smoke than it had given out since 1870, when a considerable eruption took place. The two most remarkable objects in connection with the New Zealand geysers are the pink and white terraces. These consist of regular steps, each of which forms a small basin full of the clearest water. In the case of the white terrace the water has a beautiful sky-blue appearance, while at the pink terrace the whole is tinged with a delicate salmon colour. The upper basin in each case is about 80 ft. above the level of Lake Rotomahana. The whole country round is covered with hot springs and mud wells, and the greatest caution is required to avoid an accident, which would probably be fatal.

In the Economic Science and Statistics section Mr. Hyde Clarke read a paper on the Growth of Barrow-in-Furness, in the course of which he observed that in Morecombe Bay there were between 40,000 and 50,000 acres of land which might be reclaimed with great advantage and profit to the country. It was a matter of melancholy reflection that they should remain for 100 years with a practical undertaking still unrealised; not that it was a question of mechanical or engineering difficulty, but one of an administrative character between the Crown and the Duchy of Lancaster. Not only in the case of Morecombe Bay, but that in the neighbouring estuaries, there were large areas capable of utilisation, and which would be a positive addition to the wealth and resources of the nation. The only impediment to their utilisation was one of a simply administrative nature, and he characterised the administrative treatment of the Duchy of Lancaster as not having resulted in the development of the county, but as having proved an obstruction and restriction

In the discussion which followed, Mr. James Heywood suggested that a bill should be introduced into Parliament for providing for the purchase of the rights of the Duchy at the present value—a bill which would authorise any joint-stock company to undertake the reclamation of the land and construct a railway across it. Such an undertaking would prove fairly remunerative to a joint-stock company.

Sir Wm. Wheelhouse expressed the conviction that no administration would withhold its help in the reclamation of land if a reasonable scheme were submitted. He suggested that a Royal Commission should be appointed to inspect the place, and report upon any scheme which might be carried out with advantage.

In the Mechanical Science Section the President, Mr. J Brunlees, discussed the growth of mechanical appliances in connection with the construction and working of railways and docks. He pointed out that the railway of the present day is the same in principle as the original railway, differing only in detail, progress having been gradual although not slow. Steel rails are now used instead of iron, and produced as easily and as cheaply. Very little, however, has been done in the way of consulting the comfort and convenience of the passengers. In regard to brake power he showed that trains double the weight, and running at a far greater speed than those of 30 years ago, could now be pulled up in 30 seconds within a distance of from 300 yards. In regard to the working of railways by electricity Mr. Brunless is of opinion that, although it has not advanced rapidly, it is among the possibilities of the not distant future. A tramway 1½ mile in length has been successfully worked for two years in Berlin, and a narrow gauge line 6 miles in length is being constructed from Portrush to Bushmills. It is now partially worked by electricity, and is to be wholly so worked as soon as the necessary plant is completed. As there are abundant streams in the neighbourhood, the generating power would be economically applied.

An interesting account was given by Mr. Hyde Clarke of his plans and surveys in 1836 for forming a through line of railway from Lancaster, through Furness, West Cumberland, across the Solway, to Dumfries, and thence to Glasgow. The chief feature was the passage and embankment of the large estuaries at Morecombe Bay. He complained that then, as now in the case of Southport, the Duchy of Lancaster had adopted a policy with regard to the foreshore which retarded progress: 40,000 acres of land could readily be reclaimed in the district to which his address had referred, and the value of that land raised to 60*l.* or 70*l.* per acre.

The Euphrates Valley Railway as an alternative route to India was treated of in an interesting paper by Mr. John B. Field, who contended that the railway would compete on advantageous terms with the Suez Canal for a considerable portion of the existing goods traffic to the East as a route for conveyance of passengers, troops, and mails, and would effect a clear saving of five days in the journey between London and Bombay. The political advantage of alternative route was obvious. All the great European Powers, and especially France, claimed to have interests in Egypt which might at any moment come into conflict with British interests and oblige us to defend our at present only practicable route to India by force of arms. In the event of a war with one of the great European Powers the defence of the road through Egypt to India would probabiy cost not less than from 100,000,000*l.* to 200,000,000*l.* sterling To avert this risk by the erection of the Euphrates Valley Railway at a cost of 8,500,000*l.* for a single line, or 12,000,000*l.* for a double line, would be profitable in the interests of peace and civilisation. The Euphrates Valley Railway as a commercial undertaking would appear to have quite as great a certainty of success as the Suez Cana had previous to its being made.

At the conclusion of the Sectional Meetings a meeting of the General Committee was held in the Town Hall to appoint officers for the ensuing year and fix the place for the annual meeting of 1885. Professor Cayley (President) occupied the chair. The first business consisted of the reading and confirmation of the minutes of the previous meeting, after which Professor Bonney (General Secretary) read a list of additional sectional officers who were proposed for election. The President then stated that the society had received invitations from two places in which to hold its meeting in 1885—Aberdeen and Bournemouth.

Sir Frederick Bramwell moved that the Association meet in Aberdeen in 1885 and in doing so remarked that, so far as he knew everything would tend to make the meeting in Aberdeen a most successful one. He was shocked to hear the lapse of time that had taken place since the last meeting in that city—25 years; and if the Association did visit Aberdeen, as he hoped it would, it would be nine years since they met in Scotland at all. (Applause.) Professor Fuller, formerly of Aberdeen University, seconded the proposition, which was carried unanimously.

Lord Rayleigh was chosen President elect, and those selected as Vice-Presidents for the ensuing year were—The Marquis of Lansdowne, the Marquis of Lorne, Sir C. Tupper, Sir J. A. Macdonald, Sir A. T. Galt, Sir Narcisse Dorion, Principal Dawson, W. H. Hingston, Dr. T. Sterry Hunt, Professor Huxley, Professor Frankland, Sir C. W. Siemens, and Sir Lyon Playfair. Professor Williams, of University College, was appointed treasurer; and Captain Galton and A. C. Vernon Harcourt secretaries, in addition to Professor Bonney Lord Rayleigh and Sir Lyon Playfair were appointed to fill two vacancies in the list of trustees.

# Original Correspondence.

## SILVER MINING IN AUSTRALIA.

Sir,—Having read the letter of "R. D. A.," of Sydney, New South Wales, in last week's *Mining Journal*, I should like to pass a few remarks thereon. In the first place, I should be disinclined to accept this report of a Government Mines Inspector against the evidence (whatever it may be) of the 700 tons of ore which have arrived in England from these silver mines. As to the cry of "No water," I myself came through that tract from Mount Browne 18 months ago, and from what I saw of the amount of water stored in excavated tanks for the use of the squatters' thousands of sheep, why could not a company with a small outlay also store enough water for the working of a mine? It has already been done in Australia, and, therefore, can again. Perhaps the English mining public are not aware that this kind of report is also called for yearly by the Mines Department from their wardens and wardens' clerks, and some of the latter, although Government officials, may or may not know what they are writing about. If the authority of the officials of the Mines Department is worth anything why was not Mr. E. Pittman's opinion taken as to the value of the Milburn Creek Mining property? The fact is that Australia is well worth expending some of the speculative capital on, far more so than electric light companies.

As to "R. D. A.'s" allusion to Moruya and New England, Boorook, which is the only silver mine in New England, I will only say that had it been started in the first place with sufficient capital, and, above all, with a person in charge who thoroughly understood the treatment of silver ores, it must have been a success, as it is being proved since Mr. Davey, who is a thorough metallurgical chemist, has taken charge. The fact is, Mr. Editor, that the Umberumbera Mines, being in the far north-west corner of New South Wales, and the traffic from them going to Adelaide, and most of the concerns being pushed by South Australian speculators, the Sydney people think that it is a sort of encroaching on their rights. The only apology I can offer for encroaching on your space, which is valuable, is, that I have written it in the interest of legitimate speculation, myself being a disinterested party. E. C. K.

*Camborne, Oct.* 16.

## MINING IN COLORADO—PROSPECTIVE PLACERS.

Sir,—Grand County is an extensive tract. It lies about 70 miles north-west of Denver, and is bounded by Gilpin and Clear Creeks on the east, South Park and Lake on the south, and Summit County on the west. It has yet been little explored for its minerals, and but little is known about it. I have never been there myself, and can only give such information as I glean from the hunters, ranch prospectors, and herdsmen. The geological formation is about the same as all the rocky mountain counties—gneiss and granite, with the tertiary covering the valleys. It has frequently been asked of me how gold placers, which are put on the London market at such heavy figures, are obtained. The following will throw some light on the matter, and help to give speculators an idea how the money is made—the following circumstance that occurred this last winter will explain itself:—On his return home on the approach of winter a miner and hunter at my office gives the following information, his object being to solicit my assistance. While out hunting in Grand county this past summer on the Eagle river, we fell in with two other hunters, and over the camp fire at night talking over the events of the day, I spoke of some diggings I had met within a certain place, and said I was certain there was gold there. One of them replied he knew the place very well, and also the men who prospected the ground, and made the following statement. Two ranchmen three years ago in the middle of summer went up the gulch and sunk some pits down to bed rock, and in every one found stream gold. Being satisfied of its existence they went home, procured some lumber, and packing it with their tools and provisions on the backs of their jacks (donkeys) started for the placer. With this they made two 12 ft. sluice boxes, and constructed a rude dam across the creek, and penned up what little water there was running. Commencing a little way below where they had sunk the trial pits they excavated down to the bed rock, and laid their boxes at the forebreast; this was ground sluicing. Every pan of gravel in the pay-streak gave a good colour, and in some instances produced from 10 to 25 per cent. a pan. Their chief difficulty was a want of sufficient quantity of water, for the dam only held enough after a night's accumulation to allow for more than six or eight hours' sluicing; the surface alluvial was only 3 ft. deep, and the thickness of the gravel bed 5 ft., carrying some gold all the way through, but very rich in the pay streak, which was from 4 to 12 in. thick, lying direct on the bed rock, the latter composed of mica slate, having in it numerous little veins of quartz; the strata had a sharp inclination, the serrated edges of which, together with the cross veins of quartz, formed excellent riffle ledges for intercepting the fine grained gold coming away from the workings above. They continued thus digging and shoveling for six weeks, working on an average five hours per day, and then made a clean up, which yielded $145 in free, clean, bright gold. They appear to have been dissatisfied with the result, thinking the remuneration insufficient for the labour expended, so they packed up their traps and then abandoned the diggings.

Now it is very evident from this narration that the men's failure did not emanate from any lack of quantity or quality in the gravel, but the want of water and proper sluicing appliances, for if two men alone without any other aid could obtain in this crude way of working $145 worth of fine gold in 420 consecutive working hours, it gives to each man a rate of $3·45 a day for 10 hours. The only difficulty that exists at present in the successful prosecution of these placer lands is the absence of a sufficient supply of water, but this it appears can be readily overcome, and at a comparatively small cost. About 2 miles distant, and at a much higher elevation is a powerful stream of water, constant in its flow, from which a ditch can be constructed of any capacity and brought home to the works, and the whole operated by powerful hydraulic apparatus, when no digging or shoveling will be needed in the removal of the overburden. A 1½ in. nozzle will disintegrate 100 cubic yards per day, and with care very little mercury will be required in the sluice riffles. If we estimate the gravel to only contain an average of 50 cents. per yard it will pay handsomely, as will be seen by the following maximum cost:—One foreman (a mechanic), per day, $4; one nozzle man, $3; three labourers at $2·50; lumber and nails 50 cents.=$15. Returns, $50, showing a profit of $35. The following calculations of the hydraulic power available may be useful to those interested in similar works, but 20 per cent. should be allowed for friction and waste:—The vertical height of fall is 40 ft., a 1½ in. nozzle, pressure 17·36 lbs. per square inch, area of nozzle 1·7671 square inches; whole pressure at same 30,676 lbs., velocity of issuing water 3035 ft. per minute, impinging force against the bank 4417 lbs., quantity of water discharged 31 cubic ft. per minute, speed of water in ditch 2 miles per hour, or 176 running ft. per minute, size of the flume at the bulkhead 5 ft. 7 in. square; area of ditch 55·77 square ft. Now this is a large quantity of water, and enough to work two nozzles, which should be arranged by placing one on each side of the gulch and opposite each other. All the stuff then comes into the main sluice, and the work progresses evenly; the force is sufficient to loosen any boulders a ton weight. I have taken one 100 cubic yards only as a datum of calculation per day. It will be seen this can be trebled by working night and day, which should be done during the washing season, as it only lasts in this part of Colorado four months in the year. To construct a placer works of this dimension when the ditches only cost $2 per rod for excavating, and timber is plentiful, will not exceed $15,000, or (say) including the houses, saw-mill, implements, tools, and machinery, 5000*l*. Therefore the speculation presents a very favourable aspect. The titles to the property will be vested in the name of the first locaters who commence permanent works, and secured by a United States Government patent. It should not be commenced before June 1, as the snow lies deep in the gulches up to this time. There is plenty of game and fish; many of the trout weigh 3 lbs. each. In my stable may be seen a large pile of skins brought in by the hunters, consisting of bear, elk, buffalo, deer, antelope, mink, otter, beaver, fox, and martin. It is, therefore, a fine field for the sportsman as well as the miner. Complete outfits for travelling and camping may be obtained at Alma, and guides found here who know the whole country.

*Alma, Sept.* 29. Charles S. Richardson, G.M.E

## GOLD MINING AND ITS MANAGEMENT—No. VII.

The difference between mining and rooting is not sufficiently understood by many directors (of gold mining companies) in England to enable them to appreciate the advantages of legitimate mining, as against the disadvantages of pig-rooting or fossicking a mine, which is the general system adopted by many of the new chum mining managers who are selected by London directors to squander the shareholders' capital in ridiculous efforts at gold mining in various parts of the world. The reports in your columns of mines in Asia, Africa, America, and Australasia often betray the lamentable waste of money, not only by the directors themselves, but by those entrusted with the superintendence of the work in the mines; and last week's issue contains reports fully maintaining the system of pig-rooting instead of mining. I have lately heard from a correspondent (a practical man) who was sent to examine and take charge of a mine that had been under the exhausting process of new chum mining management at the Antipodes, where he says—"I found the mine in an awful mess—'rooting' would be the proper name for it. Might as well have looked for gold under the Thames Embankment as in some places where they were working." This so-called mining manager, like others of his kind, had been wasting time and the shareholders' capital in pig-rooting or fossicking the mine to hunt for patches, so as to keep the hopes of directors alive by childish reports of assays and small crushings of a few picked samples, and always hoping to be on the verge of a "big find" that was to astonish the shareholders and make the manager famous.

The class of reports that appear to find most favour are of the sensational type or ridiculous details that only show the incapacity of the writer and the credulity of the directors of companies who allow themselves to be "promise crammed" with such reports. It would be curious to know by what process of reasoning the selection of some of the mining managers have been made, or to what occult influences they have owed their appointments. Surely not by the ordinary process that would guide judicious men of business to select managers of other occupations. The winding-up of so many ill-managed companies, and the bordering on winding-up of so many others has failed to open the eyes of many who persistantly believe that gold mining can be most successfully carried on by those who know least about it, and that the reckless squandering of capital will ensure success. The consequences are, as I have before observed, that the management of many gold mines commence with a blunder, and they keep on blundering either blindly or wilfully to the end of the chapter, till ended in winding-up, and waste of all the capital, then shareholders meet to growl at managers and directors, or at each other, and to denounce the industry of gold mining, merely because, for the most part, in such instances it has had the misfortune to be guided by incompetent hands, if not sometimes worse. It would be invidious to mention the names of any companies, but some have been brought under my notice where the proportions of expenditure as regards costs of management and the labour in the mine have been in the proportion of two to one, thus a mine employing (say) only about ten or a dozen men at a cost of (say) 1500*l*. a year was saddled with the cost of management at the rate of 3000*l*. a year, or I should have said mismanagement.

Then, again, there are mines where the directors and managers vie with each other as to who can spend money on the most ridiculous objects foreign to mining requirements. One company on the Gold Coast of Africa has spent nearly all their capital in the purchase, and experimental and ornamental work about on the surface, before opening the mine, or doing all the unproductive before the reproductive work. The wiseacres who honour the shareholders with performing the duty of expending their money in the most rapid manner consistent with their dignity, are having a jovial time—freighting ships with full cargoes of goods, building terraces of model dwellings, and instructing the dusky inhabitants in the arts and mysteries of luxurious living, while the development of the mine is of secondary importance as against sofa-lounges, dust-pans, brushes, lemon-squeezers, and articles of bed-room furniture that some less extravagant men would manage to dispense with in an African forest. Others keep calling spirits from the vasty deep by a cry for more "planks and money," and promises of washing the hills into the valleys with a new system of "hydraulicing," without water or steam-power—probably it will be by a system of concentration of the sun's rays with a series of powerful lens. There is a rare field for the operations of the inventor, as he will get his motive-power, the "sun's rays," cheap enough. Others, again, only require more confidence, more time, and not to be worried by censorious and inquisitive critics. The climate is too depressing to be bothered about such trifles as the prospects of the mines.

It is amusing at times to read the remarks of some shareholders of the "Mark Tapley" type, who are equally jolly and confident under the most adverse circumstances, and are buoyed with a hope that would gladden the hearts of most mining managers; but it is a pity that such confidence should be so often abused by incompetent advisers, as confidence and pluck, combined with prudence and economical expenditure of time, capital, and labour are great aids to successful gold mining in any country.

Thomas Cornish, M.E. (late of Australia),
Author of Gold Mining: Its Results and Its Requirements.

## COMPETITIVE TRIAL OF PULVERISERS.

Sir,—There has never been any Exhibtion in connection with the Mining Institute of Cornwall of greater interest than that just passed, and it has been said it has turned out a great success. In making the awards in the pulveriser trials, however, there has certainly been some misunderstanding or difference of opinion. The rules laid down no one could complain of. The time allowed each machine for trial was eight hours. The first and second days of the trial the weather was all that could be desired. The competitors on the first day were Capt. Teague and Mr. Pryor, jun.; on the second Capts. Nicholas, Toy, and Stephens; and the third, Dingey's. On the third day the weather had very much altered, and become very wet, with a gale of wind, and nothing could be done, as the rain prevented the belt holding. The trial was adjourned to the following day, and the secretary meantime engaged to get tarpaulins up to keep the belt dry. On coming on the ground the following day we found nothing had been done, though the weather was just as bad as that of the previus day. We were induced to go to work, but the belt was slipping off every now and then, causing several stoppages, amounting in the aggregate to an hour. After the first four hours we managed to keep the belt somewhat drier by means of tarpaulins spread over it, but the drifting rain was continually causing the belt to slip.

Notwithstanding all this the committee debited us with the whole of the coal burned, including our hour of stoppages, and published it as the amount of coals burned doing the work. The case plainly put is this—we were burning coals nine hours and only worked eight, and your readers will be able to judge for themselves whether it is right to say we burned the whole of the coal in the eight hours. As the results are printed we appear to have ground 7 lbs. of tin to the ton of coal less than the first, whereas if the amount of one hour's coal had been taken out we should have stood nearly 2 ozs. of tin to the ton of coal ahead of him; and seeing the poorness of the stuff ground, this is a substantial difference. In the face of all this the committee placed another machine first and ours second. We could not do ourselves the injustice to accept the bronze medal, so before the awards were published we wrote to the secretary and offered if the Institute would have another trial to bear our share of the expenses and forfeit the sum of 20*l*. to the successful competitor if our machine did not excel.

This challenge we are still prepared to offer to the maker of any machine. Mr. Husband blames the secretary for not supplying him with sufficient details, and stated that he should vote for a new trial or awarding us a silver medal. Doubtless it is a very awkward thing to retract; but the least they could have done would have been to award us a silver medal as well as the machine they placed at the top of the list. We however, cheerfully leave your readers to judge for themselves, confident that 19 out of 20 will see the injustice done us.

*Truro Foundry, Oct.* 17. Francis Dingey and Son.

## MINING ECONOMICS—HOW TO EARN PROFITS—No. III.

Sir,—I think I may state without fear of contradiction that economy consists in producing the greatest possible results at the smallest expenditure of time, money, or labour, as the consequences are affected by these factors. In respect of industrial or any active pursuit time implies labour, otherwise suspense—both of which conditions relatively influence results in one direction or another. What would be a satisfactory return of an investment for one year would be very unsatisfactory if the same investment only aggregated as much in ten years, and just as great a difference may eventuate, and often does, from the exercise of rigid economy, and *vice versa* from the neglect of it. Economy is much more frequently hackneyed in expression than it is honoured in practice. It is one of the prudential virtues, or one of the virtues of prudence, or the prudence of virtue itself—whose principles are not generally well understood. Niggardliness is no part of it, conduces not to it; but, rather the contrary, tacitly opposes itself to its proper action, impedes its progress, and vitiates—if it does not utterly exclude—its beneficial purposes and designs. True economy embraces the salient features of opposite extremes. It is liberal and conservative, but judiciously so in each regard; liberal when generous subscriptions to an end will proportionally accomplish greater and better results than if a sparing hand had been exercised, and the essential aid to its accomplishment withheld or curtailed. On the other hand, it is conservative where doubt is implied, and where it is not evident that a suspension or abridgment of generosity means the conservation of so much money. In respect of mining it pertains to purchases, including the mine itself or the rights acquired in regard to it—the adaptability, utility, and application of mechanism, material, and manual employments. Also, of its produce, its conservation when acquired in the crude state, the cost and completeness of its reduction whether to the metallic state or approximately by concentration or other mechanical or manual appliances. There is latitude here for laxity and waste, but equal scope for economy and gain, apart from the detail of practical proceedings, which I do not propose to enter into on this occasion; but will merely state, in passing, that there is nothing more pernicious or fatal to the exercise of economy in the underground department of mines than the working them on day-work, as is prevalent in this country, whatever the qualifications of the men may be—their skill and general competency, the emulation is retrograde, downwards—the best and most experienced hands trying "how not to do it," in order to equalise the efficiency of their service with that of the unskilled, unpractical, and unequal members of the corps. Their remuneration being alike, why should not the amount and value of their service—in irony of reason—be equal? I have no hesitation in stating that until this pernicious custom is abolished economy in one of the most vital departments of practical mining can never prevail. It came, I think, from the employment of practically incompetent superintendents in the first place, and agreeing with the majesty of labour on this coast was readily and generally adopted, stereotyped, and established—not permanently; it is to be hoped that can never be. It can easily be dispensed with and relegated to the limbo of inconsistencies, and superseded by a method more manly, rational, consistent, and profitable. Let all underground work, or as much of it as can, as in England, be done on contract, and for a time at least, until the system becomes recognised and understood, be open to all competitors. It would soon be found the affinity which skilled labour has for its kind, and an evolution would ensue from the process of such rational and natural selection as patent and potent as the development of species according to the Darwinian theory, by which the fittest would survive. Each one then would soon find his proper place and level, as experienced men are never willing to share the proceeds of their labour with incompetent partners, and emulation would be rife in different sections of the mines amongst the several corps of contractors, each trying to outvie with others in the dispatch of work, prompted by the laudable ambition of superior excellence, and its consequent pecuniary advantages.

Of the auxiliary sciences pertaining to mining the two most important are mechanical philosophy and engineering and experimental chemistry. There can be no doubt but that mechanical engineering is equal to all the requirements of modern mining to whatever extent or depth it has been or may be prosecuted; it is only a question of adaptation—its proper application, and economy. But experimental chemistry in its relation to the practical reduction of ores—that is, on a commercially workable scale—of the precious and other metals, appears until recently to have been, if not totally inactive, very much neglected. It seems strange from what is now known of the humid process recently introduced in this part of the country that experimentation in respect of it should not have been rife a quarter of a century ago, seeing that thousands of tons of good ores were excluded from reduction by amalgamation by heavy charges and serious percentage of loss demanded for and incident to the working by that method. The new process indicates an entire revolution of silver mining, and silver and gold associated. In a country like this, where the bulk of the ores is what is termed low grade, ranging from a few dollars to $50 or $100 per ton—the higher value considered medium—as a less value would not ordinarily be remunerative to the miner essaying to mine his own ores, and having them reduced at a customs mill, the difference between which and the profitable working of ores of considerably less than half of the minimum value as above—say $20 per ton—is a desideratum to both companies and unassociated miners of incalculable value, not to be over-rated or likely to be fully appraised at its true worth until taught by experience—so great is the change. Companies will realise more largely than private individuals by the improved method, as they may be promised to qualify and provide for every utility of economy, and gain by providing their own reduction-works, as conveniently arranged and suitably adjusted as possible, which very few, if any, independent prospectors or individual miners are able to do.

A 20-stamps battery will reduce for the leeching process 30 tons per day, the cost of which and its further reduction to the metallic state, together with the higher average percentage at which the ores can be worked, will amount to from $10 to $15 per ton at least, as compared with the best appointed amalgamating appliances, or a difference on the lowest calculation on a capital of 100,000*l*. of 20,000*l*. per annum, equal to a profit of 20 per cent. of difference between the two methods. I am convinced I neither over-rate or exaggerate the difference or the result, and when it is remembered that immense quantities of ores which will not begin to pay by the present prevalent method of their reduction by amalgamation will be profitably available by the leeching process it is not too much to affirm that a new era has dawned upon mining in this part of the country, and that what heretofore were regarded as profitless enterprises—in many instances worse than profitless—may now be hailed and regarded with almost unerring confidence as prolific sources of wealth—amply sufficient to largely remunerate their patrons and supporters, and creditably figure in the annals and prestige of the State. Besides which recently unregarded fields of mineral wealth will burst into prominence, hitherto unregarded from the customary cost of reducing the ores added to the almost prohibitory intermediary charges, such as carriage, &c., the entire proceeds were very frequently engulphed of much more than good average ores. As a producer of the raw material from which the metals of commerce are extracted; in other words a miner largely interested in the results of economics of this or any other kind, I hail the advent of the new process with fervid and undisguised satisfaction, as it must certainly revolutionise silver mining in this country and elsewhere where adopted, and transpose the principal terms of a trite dictum, and render success in mining the rule instead of the exception. I am fully convinced that it is the province of economy, and within its legitimate scope to effect changes in mining, the result of which, if prosecuted to its normal limits would not only perfect the revolution referred to, but eliminate from it the stigma of being—as in its preliminary stages it is supposed to be—a haphazard enterprise. I have already stated that economy pre-supposes prudence, and no industry has greater

scope for its exercise, from beginning to end, than that of mining. It is not one, but a many-sided system—a system of many parts from some of which outlets are necessarily open which, if not properly guarded, exhausting and exhaustive life-blood may both exude and be drawn from its veins—its currents vitiated at the fountain's head, its procedure encumbered, and its achievements lamentably disappointing. It is most unaccountable, from a rational point of view, why it is that correct business principles are so sedulously excluded and so generally ignored in respect of this great industry upon which so much depends. Is it not the hot haste betrayed for dividends—dividends at any sacrifice—at any cost, regardless of the consequences which such precipitancy may entail. Investment is lost sight of, supplanted by speculation of the wildest and most reckless kind. Stock board enterprises, snap-diddle performances, akin to horse jockeying the results of which, *pro* and *con*, are set down to the credit or debit of mining—to its debit most frequently, with, like the play of Hamlet, Hamlet omitted. But, *Nil desperandum*, the case is not hopeless; order may and will be educed from such confusion. The solid things in mining are the most permanently impressive, productive, and lucrative, and howsoever agreeably and facinatingly the similitude of truth may be usurped by fiction, it is but a resemblance within rigid limitations—an imitation of its external features and superficial parts. In mining, as in everything else, the fittest will survive, and the time will come, hastened by the force of events chiefly from the realisation of intrinsic values, augmented by successive improvements in the applied mechanism of practical purposes, and the equally important improvements and economics introduced for converting the ores into metals, the effect of which will be to testify and prove that mining on the merits is more satisfactory and profitable than gambling in stocks, influenced by excitements anging from blood to fever heat. Robt. Knapp.

*Ione, Nye County, Nevada, Sept.* 22.

## MINING NOTES AND RECOMMENDATIONS.

### (INDIAN GOLD MINES.)

Sir,—We have had our attention called to the fact of the cost incurred at Phœnix Mine in making the return referred to in our last letter. This, however, is tolerably apparent to everyone who has observed the course of gold mining in India. The examination after this fashion might have been extended somewhat further, and the total number of ounces of gold of all the mines might, to satisfy the curious, have been divided into the total amount subscribed. For an investigation of this sort perhaps the Electric Light companies would afford something more novel still. That there is a certain amount of logic in such a view cannot be denied, but being so narrowed it precludes the idea of progression when applied to mining. Prospective values in every respect are lost sight of. The returns which have been made have proved the existence of the precious metal; its abundance or the contrary, and the cost of its extraction cannot be determined very easily. If it is possible for profits to be made the public may rely on its being done. The history of Indian gold mining has so far been an unhappy one, but it is no reason that the future shall not be different. The conflicting statements of those who have examined this gold region have not helped the solution of the difficulties to be overcome. The burden of the testimony is largely in favour of the abundance of gold in the Wynaad district, but its profitable working is the barrier to success. Then again it is stated that if success were attained the amount of the dividends could not be large, because of the large capitals. If these companies, however, paid only 5 per cent. (a small dividend for a mine) on the original capital this would be equal to 20 or 25 per cent. on the present market price of the shares. Shares being at such a heavy discount, buyers now in the event of a rise would have a great advantage. This, of course, applies to all mining companies similarly situated—home and foreign—and it would be possible to name properties with perhaps more immediate prospects of success. We do not pretend to say that these mines possess greater merit than any other mining properties, but there is the chance of making large profits. There is a cloud over Indian gold mining which may at any time be dispersed, for the same thing has occurred a thousand times in mining. But not only is there depression here—all financial undertakings are the same—and as experience shows that such a state of things cannot always continue, investors should avail themselves of the opportunities offered. Gabbott and Co.

## MINING IN SHROPSHIRE—ENCOURAGEMENT FOR ENTERPRISE.

Sir,—Will you kindly allow me a small space in the *Mining Journal* for a few remarks on the present position of the Tankerville Great Consols, and for a few words to the ordinary shareholders to urge them to give willing and prompt financial support to the directors in their wise and energetic endeavours to fully develope the mines and obtain the riches which they undoubtedly contain. By the accounts for the eight months to May last, the total returns of ore were 7987*l.* 7*s.*, and the net expenditure 17,229*l.* 2*s.* 11*d.*, showing a loss in working of 9241*l.* 15*s.* 11*d.*; contrast this with the accounts for the months to September. Returns of ore 8145*l.* 10*s.*, and net cost 8162*l.* 14*s.* 8*d.*; the loss in working being only 17*l.* 4*s.* 8*d.* This improvement has been effected in the face of heavy dead work, and the unprecedented low price of lead. Had anything like old prices been obtained for lead, the last four months' working of the mines would have resulted not in the insignificant loss of 17*l.* but in a substantial gain. The result of the working of the mines for the last four months shows that even at the extremely low price of lead, if the mines were fully opened up and the output of ore thereby increased, that they could be worked to yield very profitable returns. Great improvement has taken place in the mines, and especially in the Tankerville during the last six months, and the last report dated Oct. 13 is still most encouraging.

Having attended the annual meeting of shareholders at the mines on Oct. 3, and viewed the property for the first time, I am quite satisfied, from all I have seen there and heard from such competent authorities as Capt. Waters and others of like standing, that the shareholders have a magnificent property in these mines, and especially in the Tankerville proper, which needs only the requisite capital to sink Watson's shaft some 27 fms. deeper to reach the junction of the two lodes, where a rich deposit of ore is almost sure to be found, like what existed at the junction of the same lodes at a higher level, and which gave such wealth to the former proprietors of the mine. Should a rich deposit of ore not be found at the junction of these lodes, then, in the words of Capt. Waters, "Nature would be freaky." But Nature, like history, repeats herself; hence our confidence in the wisdom of the attempt to reach the union of the two lodes. To accomplish this great object Capt. Waters estimates its cost at about 1000*l.* Surely this sum and what would be required to put the Bog Mine into profitable working order could easily be found among the holders of ordinary shares who have not yet taken up their quota of preference shares. It would be the height of folly to have spent so many thousands on the mines and in the sinking of Watson's shaft, and then, when on the eve of gaining the prize, for the sake of an extra thousand or so to leave it for others to seize. From the inclination of the two lodes it is evident they must meet about the depth that Capt. Waters has estimated; and he is also of opinion that the two lodes when once joined will not split up into two again, but will continue in one grand lode. Should this prove to be correct and the lode increase in richness in proportion to its depth, as such lodes are known to do in similar mines, then a valuable source of future wealth would be in store for the shareholders.

We are not asked as ordinary shareholders to contribute our *pro rata* share of the capital needed to risk or spend it in sinking shafts of doubtful utility or exploring unknown ground, but for the purpose of continuing the proved workings which scientific skill and thorough practical mining and geological experience have recommended as the best mode to fully open up the mines in order to secure the rich minerals that lie in the deeper strata and in their various sections. I have no other object in writing this than to ask my co-shareholders to take a greater personal interest in the development of their property, and to contribute their share of the money required to increase its value, as well as to secure their own continuous interest in it. At the same time I think it is not right on our part, as ordinary shareholders, to stand aloof and let the directors or others furnish the means necessary to develope the mines, and expect to share in the profits. I have no connection with the Stock Exchange or speculating mining firms. It is not long since I became a shareholder in the Tankerville, and was not aware of its exact position; but having seen it I mean to stick to it, and have faith in its future prosperity, and wish my co-shareholders to have the same confidence n it.—*Blackburn, Oct.* 16. M. J R.

## A NEGLECTED INVESTMENT.

Sir,—Investors who are constantly complaining of the small returns made on their outlay would do well at the present moment to pay some attention to the shares of the Home Mines Trust Company, who, by judiciously spreading their investments over a large number of British mines, have made such large profits, that they have recently paid a third dividend of 20 per cent., and as the principles on which the directors base their operations are believed to be perfectly sound there seems no reason to doubt that this rate will be sustained in the future, as they have now a larger capital than during the first year of operations, and not only has the company long since paid off all preliminary expenses, but a reserve fund has wisely been formed, and this is increasing in strength with every succeeding half year. The position of the Trust is undoubtedly a strong and healthy one, and places it in the first rank of home investments, whilst it is in the envious position of being the highest dividend-paying stock in the mining, or, I think I may say, any other market. In the course of only 18 months this Trust has returned 30 per cent. of its entire capital in dividends, and yet it is a fact that the shares can at the present moment be purchased at a heavy discount, so that on the price the yield is something like 40 per cent. R.

*Manchester, Oct.* 16.

## SAFETY CATCHES.

Sir,—It is not my habit of taking notice of charges preferred against anyone under a pseudonym other than their personal, as they are found on analyses, in nine cases out of ten, to be penned with some sinister motive. But as your correspondent "A. Z.," in the *Mining Journal* of Oct. 13, remarked so kindly that, under certain conditions, a future generation would no doubt erect a beautiful clay monument on the sands at Perranporth to my beloved memory, I would ask space to tender "A. Z.," my special thanks for placing me under such a deep obligation to him, and, at the same time, state (assuming from the sensitiveness "A. Z." has displayed that he is connected with one of the safety catches in question) that if he basis his claim to a monument erected to his memory on his faculty for inventing safety catches his chances are on a par with mine. Laying aside chaff, as the question at issue is undoubtedly a grave one to the miner, I would explain that my criticism in the *Mining Journal* of Oct. 6 was written in anything but a hostile spirit, but with a view to show that the wants of the county in regard to safety catches are not yet supplied. I believe the elder Mr. Teague publicly expressed a similar opinion at Tabb's Hotel on the first day of the Exhibition; anyhow, that is my candid opinion. Surely "A. Z." would not rob me of it. He appears to forget that one of the glorious privileges which we Englishmen enjoy is, that he can ventilate his opinion so long as he keeps inside the law. If "A. Z.," Mr. Seccombe, or any other of those who exhibited will bring an appliance forward to meet general requirements, I shall be one of the first to hail it with genuine delight, as I am ever ready to give praise when it is due as to administer blame. Criticism, in an honest spirit, is healthy, and often productive of good. "A. Z.'s" letter bears out the statement that truth at all times is not palatable. Whatever my imperfections may be, I have the courage to attach my name to my opinions, which, in the present case, have not been disproved. If "A. Z." had signed his name I would comment on other items in his letters. I appreciate the whole of that document, with the exception of the initials he has adopted, instead of his name.

*Perranporth, Oct.* 16. W. Niness.

P.S.—Since writing the above, I notice in the report from Cornwall, in the *Mining Journal* of Oct. 18, that my statement relative to their being an entire absence of originality amongst the models of the safety catches is borne out by the fact that Mr. Warington Smyth was shown the other day similar appliances, which had been abandoned in the coal district through their non-applicability.

W. N.

## PERRANZABULOE MINES.

Sir,—It is indeed a source of gratification for me to learn that this district is at last attracting the attention of mining speculators, and I have not a doubt ere long it will resume the rank it formerly held amongst the rich mineral districts of Great Britain.

Following the course of the Gravel Hill or Great Perran lode from the granite cross referred to in a former letter, towards the highway betwixt Cubert and Perranporth a solitary engine-house chimney prominently comes in view, which is the only remnant left of the former working of the mine in the sett through which traverses the Mount and Trebisken lode, from which the richest silver-lead has been extracted yet found in any lode in the United Kingdom; and, strange to relate, comparatively speaking, very little work has been done on this important lode. The parties who last worked it, unfortunately passed through the Bankruptcy Court, and that institution disposed of the materials, and in consequence the mine ceased working, and has since remained dormant. However, a party are now in treaty with the Duchy for a lease to restart operations in this fine property, and it is the opinion of experienced miners conversant with its merits that only a small outlay is necessary to make it remunerative. The water is light, and the property contains many natural advantages for laying out a mine. Amongst the important points in connection with it is that the Cornish Mineral Railway runs into it.

The subjoined will give an idea as to the extraordinary richness of the ore sold from the mine in the last working:—Four tons realised 2000*l.*, 7½ tons realised 1100*l.* Prof. Warington Smyth assayed ore from the lode worth 800*l.* per ton, and samples of ore can now be taken from the lode in the back of the adit which will assay up to the value of 500*l.* per ton. The last men who worked there on tribute when the mine was filling with water, sold their ore at the rate of 750*l.* per ton. The unprecedented value of the ore may appear incredible; but taking into consideration the fact that quantities of native silver have been met with in the lode it is not to be wondered at. The little work that has at present been done on the lode is surprising. It appears the engine-shaft has been sunk to a depth of 38 fathoms from surface; the adit comes in about 18 fms., below which point the 10 fathom level has been driven 20 fathoms from each end of the shaft. The greater portion of the lode above these levels has been worked away; below little or nothing has been done beyond sinking the engine-shaft. The ground is inexpensive to work, as the sinking of the shaft can be executed at 9*l.* per ton, and the levels driven at 2*l.* 10*s.* per fathom. The length of the sett is about a mile on the run of the lode, from the general characteristics of which, with the congenial nature of its surroundings, there is every possibility of the mine, if judiciously handled, proving a safe and lucrative investment. W. Niness.

*Perranporth, Oct.* 15.

## NEW HOLMBUSH.

Sir,—I visited this above mine to-day, and was pleased to see such splendid rocks of copper ore. Many years have passed away since I saw such large rocks of ore from Holmbush Mine. At the Exhibition in London in 1851, however, there was a rock of copper ore weighing 1 ton 10 cwts., and a solid rock of lead that weighed 1 ton 4 cwts. sent to London at that Exhibition from the Holmbush. Many times when I worked there as a tributer we were obliged to take the wagon off the wheels and get planks and roll the ore on the under carriage to get it to the shaft, and then take the chain of the kibble and put round the rocks of ore and get it at surface that way. I hope from the present discovery that the time is not far distant when we shall see facts similar, and as there are thousands of fathoms of whole ground standing on this bunch of ore above the bottom of the shaft, I see no reason to doubt it. It would be a little more encouragement to the present shareholders if they could keep going both shafts. The shafts are down nearly half the depth of some of our deepest mines, and all their plant and machinery of the best brand. Although the directors have had a hard pull and a long pull against the stream, I hope now they have a brighter future in view that will make up for the troubles of the past.

*Callington, Oct.* 17. Jno. Buckingham.

## TREBARTHA LEMARNE.

Sir,—I have again visited this mine, and find the Gulley lode is still improving. There were many of the largest shareholders present, enough to represent about one-half of the mine, and all were highly pleased. The lode in Lusky although not rich is very promising looking and well defined. I shall not be surprised to hear of a course of ore struck on at any time. Jno. Buckingham.

*Callington, Oct.* 17.

## THE NEW PATENT, DESIGNS, AND TRADE MARKS ACT.—No. III.

### EXTENSION OF TERM OF PATENT.

25.—(1) A patentee may, after advertising in manner directed by any rules made under this section his intention to do so, present a petition to Her Majesty in Council, praying that his patent may be extended for a further term; but such petition must be presented at least six months before the time limited for the expiration of the patent. (2) Any person may enter a caveat, addressed to the Registrar of the Council at the Council Office, against the extension. (3) If Her Majesty refer any such petition to the Judicial Committee of the Privy Council, the said committee shall proceed to consider the same, and the petitioner and any person who has entered a caveat shall be entitled to be heard by himself or by counsel on the petition. (4) The Judicial Committee, in considering their decision, are to have regard to the nature and merits of the invention in relation to the public to the profits made by the patentee as such, and to all the circumstances of the case. (5) If the Judicial Committee report that the patentee has been inadequately remunerated by his patent, Her Majesty in Council may extend the term of the patent for a further term not exceeding seven, or in exceptional cases, 14 years; or to order the grant of a new patent for the term therein mentioned, and containing any restrictions, conditions, and provisions that the Judicial Committee may think fit. (6) Her Majesty in Council may, from time to time, make rules of procedure and practice for regulating proceedings on such petitions, and subject thereto such proceedings are to be regulated according to the existing procedure and practice in patent matters of the Judicial Committee. (7) The costs of all parties of and incident to such proceedings are to be in the discretion of the Judicial Committee, and the orders of the committee respecting costs shall be enforceable as if they were orders of a division of the High Court of Justice.

### REVOCATION.

26.—(1) The proceeding by *scire facias* to repeal a patent is abolished. (2) Revocation of a patent may be obtained on petition to the Court. (3) Every ground on which a patent might, at the commencement of this Act, be repealed by *scire facias* will be available by way of defence to an action of infringement, and will also be a ground of revocation. (4) A petition for revocation of a patent may be presented by—(*a*) The Attorney-General in England or Ireland, or the Lord Advocate in Scotland. (*b*) Any person authorised by the Attorney-General in England or Ireland, or the Lord Advocate in Scotland. (*c*) Any person alleging that the patent was obtained in fraud of his rights, or of the rights of any person under or through whom he claims. (*d*) Any person alleging that he, or any person under or through whom he claims, was the true inventor of any invention included in the claim of the patentee. (*e*) Any person alleging that he, or any person under or through whom he claims an interest in any trade, business, or manufacture, had publicly manufactured, used, or sold, within this realm, before the date of the patent, anything claimed by the patentee as his invention. (5) The plaintiff must deliver with his petition particulars of the objections on which he means to rely, and no evidence shall, except by leave of the Court or a judge, be admitted in proof of any objection of which particulars are not so delivered. (6) Particulars delivered may be from time to time amended by leave of the Court or a judge. (7) The defendant shall be entitled to begin, and give evidence in support of the patent, and if the plaintiff gives evidence impeaching the validity of the patent the defendant shall be entitled to reply. (8) Where a patent has been revoked on the ground of fraud, the comptroller may, on the application of the true inventor made in accordance with the provisions of this Act, grant to him a patent in lieu of and bearing the same date as the date of revocation of the patent so revoked, but the patent so granted shall cease on the expiration of the term for which the revoked patent was granted.

### CROWN.

27.—(1) A patent is to have to all intents the like effect as against Her Majesty the Queen, her heirs and successors, as it has against a subject. (2) But the officers or authorities administering any department of the service of the Crown may, by themselves, their agents, contractors, or others, at any time after the application, use the invention for the services of the Crown on terms to be before or after the use thereof agreed on, with the approval of the Treasury, between those officers or authorities and the patentee, or, in default of such agreement, on such terms as may be settled by the Treasury after hearing all parties interested.

### LEGAL PROCEEDINGS.

28.—(1) In an action or proceeding for infringement or revocation of a patent, the Court may, if it thinks fit, and must, on the request of either of the parties to the proceeding, call in the aid of an assessor specially qualified, and try and hear the case wholly or partially with his assistance; the action shall be tried without a jury unless the Court shall otherwise direct. (2) The Court of Appeal or the Judicial Committee of the Privy Council may, if they see fit, in any proceeding before them respectively, call in the aid of an assessor as aforesaid. (3) The remuneration, if any, to be paid to an assessor under this section shall be determined by the Court or the Court of Appeal or Judicial Committee, as the case may be, and be paid in the same manner as the other expenses of the execution of this Act.

29.—(1) In an action for infringement of a patent the plaintiff must deliver with his statement of claim, or by order of the Court or the judge, at any subsequent time, particulars of the breaches complained of. (2) The defendant must deliver with his statement of defence, or, by order of the Court or a judge, at any subsequent time, particulars of any objections on which he relies in support thereof. (3) If the defendant disputes the validity of the patent, the particulars delivered by him must state on what grounds he disputes it, and if one of those grounds is want of novelty must state the time and place of the previous publication or user alleged by him. (4) At the hearing no evidence will, except by leave of the Court or a judge, be admitted in proof of any alleged infringement or objection of which particulars are not so delivered. (5) Particulars delivered may be from time to time amended by leave of the Court or a judge. (6) On taxation of costs regard will be had to the particulars delivered by the plaintiff and by the defendant; and they respectively shall not be allowed any costs in respect of any particular delivered by them unless the same is certified by the Court or a judge to have beed proven or to have been reasonable and proper, without regard to the general costs of the case.

30.—In an action for infringement of a patent, the Court or a judge may on the application of either party make such order for an injunction, inspection, or account, and impose such terms, and give such directions respecting the same, and the proceedings thereon as the Court or a judge may see fit.

31.—In an action for infringement of a patent, the Court or a judge may certify that the validity of the patent came in question; and if the Court or a judge so certifies, then in any subsequent action for infringement, the plaintiff in that action on obtaining a final order or judgment in his favour will have his full costs, charges, and expenses as between solicitor and client, unless the Court or judge trying the action certifies that he ought not to have the same.

32.—Where any person claiming to be the patentee of an invention by circulars, advertisements, or otherwise threatens any other person with any legal proceedings or liability in respect of any alleged manufacture, use, sale, or purchase of the invention, any person or persons aggrieved thereby may bring an action against him, and may obtain an injunction against the continuance of such threats, and may recover such damage (if any) as may have been sustained thereby, if the alleged manufacture, use, sale, or purchase to which the threats related was not in fact an infringement of any legal rights of the person making such threats: Provided that this section will not apply if the person making such threats with due diligence commences and prosecutes an action for infringement of his patent.

## REPORT FROM CORNWALL.

*Oct.* 18.—But for one fact the week would apparently have been of unqualified dulness. The welcome news on Saturday that a capital discovery had been made in the flat lode in West Frances not only, however, sent that mine ahead, but, to some extent, exercised an encouraging influence in other directions; and, in spite of the depressed price of metals, there is really, therefore, some hope of a more general improvement. But the market for some time yet will evidently be very sensitive, and require careful watching. According to rule, some discoveries ought to be near at hand.

Some very hard words were used not long since in a journal which has the position of a financial authority concerning the present aspect of mining affairs in Cornwall and Devon. The immediate occasion was the publication of the long list of chiefly limited mines, which, ere long, will cease to encumber the muster-roll of mining properties. Some of the observations made were evidently caused by a confusion of ideas between old mines with familiar names and established reputations and more modern mines, which, in some cases, have their only claim to notice in the varied repetitions of these old names on the score of locality. So far, the blunders made were of very little practical consequence; but when, reasoning from this utterly gratuitous assumption, that the mines in question were mainly mines that had been worked out, the article in question went on to speak of the mineral deposits and the mines of Cornwall as exhausted and worthless, it is hardly possible to imagine a more egregious or more dangerous error. It shows once more the evil of a "little knowledge, and it proves that an acquaintance with all the minutiæ of railway enterprise and shares of a miscellaneous character by no means qualifies any one to give an opinion about so specialist a topic as mining.

Nothing can be farther from the truth than the assertion that the mineral deposits of Cornwall and Devon are exhausted. Although the mines have been working for century after century, what has been taken away can hardly be said to bear an appreciable relation to what is left, for the deepest mines are those that have developed the greatest riches, and there appears no limit to the productiveness of lodes in depth. The whole question is one—not of the existence of mineral wealth, but of the development of the best means for its profitable realisation, and the application of the capital invested to actual work in the best possible way.

It is unlucky for mining enterprise that with it misfortunes do never—in the most literal sense—come alone. The defalcations of Mr. Boyns, or his various "irregularities," if the term is considered preferable, have hardly ceased to shake confidence in the financial conduct of our mines—by way of supplement to the far more serious Mayne malversations at Dolcoath—than another crop of rumours fills the air, to find more definite realisation in the announcement that one of the principal officers of Wheal Jane and sundry other concerns, is missing, and that the adventurers in Wheal Jane are to meet to-morrow to find out what this may mean for them. In the absence of official information it would be neither wise nor fitting to comment further; but we confess to being very curious to know how in this matter especially the question of audit is affected. What we have contended is that—the very strictest audit, since in the nature of things it cannot be perpetual, can only limit the area or time of possible fraud, and that in the interim between audits there must be some room for improper dealing. One of the reasons why audits fail to realise their intended object is that they are regarded too often as infallible, and that is left to be secured by a mere mechanical checking of figures which can only be attained by direct and constant supervision.

The announcement that quicksilver exists in the rocks near Exeter was made some years ago, and excited a good deal of interest for awhile. So far as the investigations were then carried, however (and the writer was one of those who made personal enquiry, and obtained some of the metal), there did not seem to be sufficient reason to conclude otherwise than that its presence was not natural. Now attention has been again called to the point it is surely desirable that adequate steps should be taken to settle the point definitely. So far quicksilver is not accepted as an English mineral, but there is surely no reason *per se* why it may not be.

## TRADE IN SOUTH WALES.

*Oct.* 18.—Trade at the principal South Wales ports maintains its active state, and prices are very firm. A rise of 1¼ per cent. has been granted to the men at the Ocean Collieries according to the following award:—"39, Park-row, Leeds, Oct. 15, 1883.—To the proprietors of the Ocean Collieries and their workmen: Gentlemen,—We beg to report that in accordance with the agreement entered into between you, dated Sept. 25, 1882, we have attended at the offices of Messrs. David Davies and Co., and carefully examined their books and accounts for the three months ending Sept. 30, 1883, and we find the average price realised by that firm for colliery screened large coal, delivered f.o.b. at Cardiff, in that period to be such that, in the terms of the agreement, the rate of wages to be paid for the ensuing three months is 1¼ per cent. above the standard.—We are, gentlemen, yours faithfully, J. C. KIRK and Co." At the Ferndale Collieries a rise of 2½ per cent. has been conceded by the arbitrator as follows:—"Gentlemen,—We beg to report to you, acting respectively on behalf of the proprietors of the Ferndale Collieries and their workmen employed respectively at those collieries, that we have, in accordance with your instructions, attended at the Cardiff offices of Messrs. D. Davies and Sons, and that we find by a careful examination of their books that the average net selling price obtained by that firm for colliery-screened large coal, delivered f.o.b. at Cardiff, in the three months ending Sept. 30, 1883, admits of an advance of 2½ per cent. upon the scale." The amount sent away last week at Cardiff was 127,482 tons foreign, and 27,736 tons coastwise; Newport, 26,897 tons foreign and 21,023 coastwise; Swansea, 20,028 tons foreign and 9708 coastwise. Colliery-screened are quoted at Cardiff at from 11s. to 11s. 6d., doubled-screened 9d. extra.

The men are nearly back at the iron and steel works, at the reduction of 5 per cent. in some instances and 10 per cent. in others. at Tondu a meeting of the puddlers, by a ballot of 40 against 16, decided to resume work on the terms offered by the masters at the outset last Saturday week—a 5 per cent. reduction. To the blast furnacemen is offered a concession—the masters will agree to a 5 per cent. reduction instead of 10; or the masters will pay them by day work—founders 4s. 10d, and fillers 4s. 6d. The founders say they will accept 5s. per day, the fillers 4s. 8d., so it is a question of 2d. only that stands in the way with them. Thus only the blast furnacemen will have been gainers by the strike. Several parcels of iron, amounting in the aggregate to 4591 tons, were sent away from Cardiff last week. Newport shipped 3566 tons to the following destinations:—Galatz, 1400 tons; Aarhuces, 1390 tons; Paysandu, 360 tons; Dieppe, 250 tons; Genoa, 156 tons; Barcelona, 10 tons. Iron ore is not coming in in such large quantities. Cardiff received last week 6898 tons from Bilbao, and 1728 tons from other places; Newport, 4100 tons from Bilbao, and 3510 tons from other places. Stocks are low at the present time in Spain, and as the days are shortening the amount sent away will not be so great as heretofore, so that merchants on this side look to better prices than they have been receiving for some months past. The present price is quoted at about 13s.

The Tin-plate Trade is in a more encouraging condition. White manufacturers keep their supply equal to the demand. They have the trump card in their own hands. At the Quarterly Meeting at Birmingham last week, boxes were put up 1s.; merchants now quote from 16s. 6d. to 17s. for good I.C. brands. Stocks are low, and there is every prospect for a good winter's trade.

## REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

*Oct.* 18.—Ironmasters in South Staffordshire are entering into their quarterly contracts for supplies of coal on very easy terms. This will be readily understood when I state that inferior sorts of forge coal are offered in the open market this week at 5s. 6d. per ton at the pits of 23 cwts. to the ton, and good forge coal can be got at 6s. to 6s. 6d. per ton long weight. Yet in the face of these prices the colliers press their agitation for an advance. The average employment at the pits in the district lying between Wolverhampton and Cannock Chase is estimated at the present time as equal to four and a-half days per week, and on the Chase itself as equal to five days. Best deep house coal is priced at 11s. per ton at the pits, and best shallow at 10s. per ton. But in actual business rather less than these prices are being accepted. The pig trade does not show improvement on the week. Stocks are heavy on native makers' premises. The number of furnaces blowing in South Staffordshire and East Worcestershire at date is estimated at 42. The chief Staffordshire firm—Messrs. Alfred Hickman and Sons—are producing between 1000 and 1200 tons weekly, and the Lilleshall Company, Shropshire, are producing 1100 tons. All-mine pigs are still quoted 62s. 6d., but 60s. will be accepted here and there for a good contract. Part-mine pigs are 50s., and common a minimum of 37s. 6d. The order books of the finished iron makers show an increase now that the Quarterly Meetings are over. Prices of sheets remain at 8*l.* 5s. to 8*l.* 10s. for doubles; and bars are 7*l.* 10s. to 6*l.* 5s. per ton.

A meeting of the makers of sheets of all descriptions and of hoops was held to-day in Birmingham to consider the Government standard wire gauge. Mr. B. Hingley presided. It was explained that the proposed gauge would be very inconvenient in the sheet and hoop trades, and it was resolved that a deputation should wait upon the Board of Trade to secure, if possible, a separate gauge. It was decided to reject the Government gauge.

The claim of the colliers in South Staffordshire for an advance of 10 per cent. is to be argued before the umpire to the Coal Trade Wages Board in Wolverhampton on Monday. The masters say they will resist the claim to the utmost.

The bulk of the mineowners in the Silverdale, Apedale, and Tunstall districts of North Staffordshire, after a five months' struggle with their men, have so far conceded their claim as to consent to pay the old rate of wages on the condition that the men first work for a fortnight at the 10 per cent. reduction against which they struck. About 2000 men are affected by this arrangement, and they are mostly ironstone miners. Owing to the strike stone has become very scarce and valuable, and in addition to this the ironstone miners, it is stated, did not participate in the advance given to the colliers in the spring of 1881. It would seem, however, that Messrs. Clive, of the Clanway Colliery still refuse to give the old rate of wages. At a meeting of operative delegates, on Monday, it was resolved to support the men at this colliery till they get the same terms as at the other pits; and further to direct men who during the last five months have resumed at the reduction to give notice at once for the old rate. It was, moreover, "decided to join the other districts of the country in demanding an increase of 15 per cent. in the terms paid prior to the reduction."

## REPORT FROM DERBYSHIRE AND YORKSHIRE.

*Oct.* 18.—Lead mining in Derbyshire does not appear to improve, and in most instances is evidently carried on under considerable difficulties. There may be, and no doubt are, a few exceptions; still most of the mines are anything but sources of profit, for in some instances they barely return the workers more than labourers' wages. Mr. Wass of course is an exception, for his Millclose Mine alone has returned him many thousands of pounds annually, although there was a large outlay in the first instance. Not so long since great things were expected of the Magpie Mine, but that has come to grief, bringing down along with it its principal owners. The Mill Dam Mining Company is evidently not in a flourishing state, for the pumping appliances have not been found sufficient, and at a meeting of the shareholders held during the week a call of 5s. per share was decided upon. Owners, however, can only look forward to the price of lead going up, for the present is anything but bright, and there does not appear to be any likelihood of a speedy change for the better. Ironstone mining in Derbyshire is not now carried on to anything like the extent it was even a few years ago. At one time the Staveley Company used to raise upwards of 150,000 tons a year, the Butterley Company 100,000 tons, whilst a good deal used also to be raised by the Sheepbridge Company, and at Wingeworth, West Hallam, and other places. Now, however, most of those engaged in the production of iron appear to prefer the ore brought from a distance, so that large quantities are now brought from Lincolnshire, Rutland, and Northamptonshire. Some ore has been raised nearer at hand in the adjoining county of Leicester, as well as in Nottinghamshire; but it does not appear to have paid well, for operations have not been extended, although iron is now made in Nottinghamshire, yet the stone is brought from Northamptonshire, where the Stanton Company has a considerable royalty.

The Coal Trade has not undergone much alteration, but the masters are evidently determined to meet the demand for an advance of wages with the strongest possible opposition. On Tuesday a meeting was held at Derby on the subject, when the colliery owners agreed to act in concert with those in the West Riding in resisting a demand for which there is not the slightest ground for making, excepting the wild and unfounded statements of those who have initiated the movement for increased wages. Such a combination cannot fail to make itself felt should the men persist in carrying out their threats, but in all probability they will go to the verge of striking, and then fall back as they have done before. The coal trade, however, is in a tolerably healthy state, and as the men are well employed they are not likely to give up their present position with fair wages for what they are likely to obtain from a strike. Then there is the question of support, and so far as Derbyshire is concerned there is no fund on which the men could fall back upon for support in the event of their striking.

There has scarcely been so much doing with the Metropolis in house coal of late, for merchants have evidently gone to the extent of their purchasing power as regards immediate requirements, and have also supplied many of the largest consumers, so that the demand is not now likely to be so heavy as it was up to a recent date. This is the result of the agitation on the wages question that has been going on, unsettling the trade, making it comparatively brisk in the usually dull season, and, in all probability, less active during the winter months. Steam coal has gone off fairly of late, even as regards London, whilst an increased business has ruled as regards gas coal. The Iron Trade has kept up well, so that in addition to the large quantity used at the local works Derbyshire pig has met with a steady enquiry for both Staffordshire and Lancashire. The demand for foundry material has in no way fallen off, so that the Staveley and other works are having a rather good time. There is also more activity at the forges than for some time past, some of the mills again running at something like their former rate.

In Sheffield the last quarter of the year has opened out favourably, more being done in the higher departments, which for some time past have not been so good. There has, however, not been much change as regards the production of steel, which has kept up steadily. The falling off in the Bessemer rail trade is to some extent being counterbalanced by special descriptions of the raw material being produced for several other purposes, including certain qualities of cutlery and tools. The leading cutlery houses have become busier, and there is more doing as regards ordinary pocket and fancy knives. A good deal of crucible steel is being absorbed for carriage and cart wheels, springs, axles, and tyres. Some good orders have been received for various descriptions of wire for fencing, whilst there is also a large out-put for umbrellas, especially in Fox's patent. Not much as yet is being done in skates, the weather not being such as to encourage makers to commence operations on a large scale. Tool makers are favourably off for work just now, whilst the file trade is steady more than active.

In the heavy department business is good, and at both the Atlas and Cyclops Works there is continued activity in the turning out of armour plates, there being heavy contracts in hand from several Governments, including our own. For other descriptions of plates, as well as sheets and hoops, several of the foundries are now busier than they have been for a considerable time past, orders having come for various kinds of material for exportation. The engine-works are also favourably off for business as regards both stationary and locomotives. The collieries in the Sheffield districts have worked well of late, although the demand for some descriptions of coal is not quite so brisk as it was even two or three weeks ago. From several places there has gone off large quantities of steam coal to both Hull and Grimsby for exportation, more especially to the North of Europe.

## TRADE OF THE TYNE AND WEAR.

*Oct.* 17.—The output of coal here generally continues good, and there is a strong steady demand; prices are firm, with a rising tendency. The demand for best steam coal continues good, and the price is well maintained at 10s. per ton. There is also a good demand for steam, small, bunker, and manufacturing coal for local consumption, and also for export. In Durham there is now an excellent demand for house and also for gas coal, and most of the works are fully employed. At present there appears to be a prospect of better prices during the winter, and consequent higher wages for the miners. The demand for Durham coke continues good, and prices have a rising tendency. The new coke-ovens at Castle Eden Colliery have yielded their first production of coke, and the quality of the article produced is well spoken of by competent judges. The Bearpark Coking Company, near Durham, where one of the finest plants for cokemaking is to be found, are about to put down 50 new ovens on the Simon-Carvès system. It will be recollected that this system of making coke attracted very much attention during the late meeting of the Iron and Steel Institute at Middlesborough, when a paper on the subject was read by Mr. Robert Dixon, manager of the coke-ovens worked on this system at Messrs. Pease's collieries, near Crook, Durham. The cost of these ovens where 100 are erected is given in this paper as 179*l.* 2s. 2d. per oven, about three times the cost of the ordinary beehive oven. About 77 per cent. of good coke is produced per oven, and in addition there is an enormous production of bye-products—tar, ammonaical liquor, and gas. The production of coke per week is about 13 tons per oven, or per annum 675 tons, which gives for 50 ovens 34,000 tons per annum nearly. If the coke should on trial prove to be of good quality for ironmaking the success of the system appears to be pretty certain, and its adoption by the great coke manufacturers in Durham will follow. Should it be generally adopted it is not possible to calculate the value of the ammonia and other bye-products expected to be secured. Of course, only experience on a large scale can determine the value of the coke produced; but should it prove to be of equal value as compared with the coke produced by the old coke-ovens, the value of the Durham coal field will be increased to an enormous extent. The shipments of coal and coke at Tyne Dock has been above an average; over 19,000 tons per day have been shipped, and 117,319 tons for the week, or about 12,000 tons above the quantity for the corresponding week of last year.

The Iron Trade continues quiet, and prices are stationary, based on No. 3 pigs about 39s. The weather having improved shipments have increased from the Tees; last week 25,000 tons of pig-iron were shipped, 2430 tons of manufactured iron, and 1446 tons of steel. The demand for manufactured iron continues fair—plates are 6*l.*, and angles 5*l.* 10s. All the mills are fully employed for prompt delivery, but not many contracts for future execution are being given out. Lower prices are being accepted for future delivery. Hematite iron is dull at 49s. per ton. Iron shipbuilding on the Tyne continues to flourish, and most of the trades connected with this great industry are fully employed. Engineers, boiler-makers, and founders continue as a rule to be very well employed. Another new yard for iron shipbuilding has been commenced at Bell Quay, on the Tyne. At Sunderland the engineers' strike has had a most injurious effect on iron shipbuilding and all the iron and other trades on the Wear. There is no prospect at present of the termination of this most unfortunate strike, and we consider that a great mistake has been made on the part of the men in refusing to submit the question in dispute to arbitration, Most difficult questions of this kind—trade disputes—have been settled in this way, and we can perceive no reason why this cannot be settled in the same way. The men who are members of the Amalgamated Society of Engineers are well supported from the funds of the society, as they receive a payment of 14s. per week per man and also 1s. per week for each child. In the meantime the masters are not idle; they have secured a considerable number of hands from other districts, and they have also a large number of apprentices at work. The strike has, however, checked very seriously the progress of iron shipbuilding on the Wear, and the number of ships in course of building has been much reduced since the commencement of the strike.—[This strike has now assumed a more complicated aspect, as a large number of the apprentices employed have also come out, and it appears to be probable that the whole of the apprentices will take the same course. The reason alleged is that the new hands employed are not qualified to teach the lads their business. As a large number of the apprentices are bound for a term of years they will be prosecuted for leaving their employment.]

The Chemical Trade in these rivers continues to improve. There is a strong demand, and the most important products are getting scarce. Bleaching powder, which was sold at the commencement of the present year at a little over 4*l.* per ton, is now currently sold at 8*l.* 15s. per ton, and for forward delivery at 9*l.* per ton; and other chemical products have also advanced in proportion. Should the attempt of the Tyne Chemical Company and others to procure a large supply of salt on the Tees prove successful, the position of the trade will be further improved. The prospect for the trade at present is certainly encouraging. There is also an excellent demand for Portland cement on the Tyne at present, and also for fire-bricks and all kinds of fire-clay goods.

INSTITUTE OF MINING AND MECHANICAL ENGINEERS.—At the general meeting of the members of this Institute, in the Wood Memorial Hall, Newcastle, on Saturday, there was a large attendance of members and others interested in the safe working of coal mines, as two papers (of which abstracts were published in last week's *Mining Journal*) were to be read bearing on this important subject. In the discussion which followed the reading of Mr. Henry Lawrence's paper "On the danger of sparks produced from prickers and stemmers used for blasting purposes in coal mines, and sparks otherwise produced," a general wish was expressed that this metal might be thoroughly tested and successfully used, and Mr. Lawrence promised to send specimens of those tools to be tried in Messrs. Bell Brothers' Cleveland mines.

The paper by Mr. Frank M. Still, secretary of the Compressed Lime Cartridge Company, "On mining Coal by Compressed Lime" was next read (see abstract in last week's Journal). This method of bringing down coal has been patented by Messrs. Sebastian Smith and Moore, of the Shipley Collieries, Derbyshire. He explained the mode of bringing down the coal after it has been holed underneath by means of compressed lime. In the discussion which ensued after the reading of the paper some of the speakers stated results of experiments in this district where the process had not been successful. The discussion was adjourned until the next meeting, when a paper will be read "On Wedging Coal." This system has now been before the public for a considerable period, and we are surprised that it has not made more progress in this district. The system of bringing down coal by blasting with powder ought certainly to be entirely discarded in all fiery mines. Only a few days ago an explosion of gas took place from this cause in the Thornley Colliery, South Durham, by which three men were much burnt, and it will not be denied that the result might have been much more serious. It would have been well, however, if the cost of the process had been stated in the

paper, as compared with the cost of blasting by means of powder. When the system was first introduced here there were many complaints respecting the charges made for the lime cartridges supplied, and, of course, economy must be studied by colliery managers. The old system of wedging coal by means of iron wedges and hand labour by mallet cannot be carried out without adding considerably to the cost of getting the coal, and various attempts have been made during the past 50 years to introduce wedging by mechanical means. We recollect witnessing a trial of a machine of this kind in the Hartley seam at Seghill Colliery about the year 1830, but this machine proved a failure. But this appears to have been accomplished at length.

Mr. W. F. Hall and Mr. Lowe, of Haswell Colliery, Durham, have patented a new mechanical wedge for bringing down coal, and a trial of the machine was made in the Low Main Seam at Haswell a few days ago. The seam is 3 ft. 3 in. in thickness. The seam was holed in longwall work 9 yards in length. A hole was put in on the "fast" side of the work, and into this hole the wedge was inserted, and in a very few minutes the whole of this 9 yards of coal, weighing about 10 tons, was brought down in large blocks and in the best possible condition. The wedge was next tried in a "whole bord" where "pillar and stall" is worked, the bord being 6 yards in width. This was holed in the usual manner at the bottom of the seam. A hole was bored at each side of the bord, and wedges were inserted into each of those holes, and this coal was also brought down in a few minutes in large blocks. The increase of round coal by this system amounts to from 10 to 15 per cent. The machine is quite portable, and can be used without difficulty. This important trial was witnessed by Messrs. Crawford, Patterson, and Forman, agents of the Durham Miners' Association, and they have reported very favourably of the results. Looking at the results of this trial it appears to be quite unnecessary that a risk of exploding gas should be incurred by blasting with powder in ordinary coal. No doubt further trials are necessary in various descriptions of coal, and it is also necessary to test the machine in bringing down stone, as it is often necessary to blast the stone roof in order to make sufficient height in dangerous situations.

## REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

*Oct.* 18.—Among the great industries of this district is that of limestone quarrying. A belt of the carboniferous limestone stretches from Llanymynech on the south-east to the Great Ormeshead, and into the island of Anglesea on the north-west. Along this belt there are some thirty great quarries, besides numerous lesser ones worked for local use. Among the former are those of Llanymynech and Porthywaen, worked by Savon and Company and Mr. Williams. In the Llangollen Valley there are those of the Vron on one side, and of Trevor and the Eglwyseg rocks on the other. To the west of Wrexham there are the great quarries of Minera. Then there are those grouped around Holywell, and on the coast there are the two great quarries near Llandulas, the tall chimneys of whose Hoffman's Kiln are seen from afar; and further still are the marble quarries of Anglesea. The lower beds of the limestone are pale coloured, and containing a little manganese, often assume a dolomitic form. These give the whitest lime, and they are largely quarried for fluxing stone, which is sent to the iron furnaces of Shropshire, and from the Minera district considerable quantities are sent to the glassworks of St. Helens. These lower beds are also quarried for agricultural lime; but the preference is given by farmers for the lime obtained from the upper dark coloured limestones; the reason being that, owing to a larger quantity of phosphatic matter being present, the lime has greater fertilising properties. I do not suppose the farmers know the cause, but they appreciate the result. Rather fine building stones have been quarried from the grey and greyish blue beds of Treflach. Here there are two beds full of corals and encrinites, which give a stone like the marble of the Derbyshire limestones, but of a larger pattern and darker colour. The marble of the Anglesea limestone quarries is of a lighter colour, and forms a fine building stone. Good examples of these stones are seen in the piers and approaches of the suspension and tubular bridges of Conway and the Menai Straits. Some of the upper beds near Holywell contain more sulphur and alumina and they make a good hydraulic lime.

It is in the middle and lower beds of this limestone range that the deposits of the ores of lead, zinc, and, to a more limited extent, copper are found; but just at the present time limestone quarrying is more profitable than limestone mining, although with the return of higher prices there would come again a renewal of prosperity.

The depression in lead mining is severely felt in all the mining districts—Shropshire, Montgomeryshire, Cardiganshire, and Carnarvonshire, while copper mining in Anglesea seems almost to have reached its worst. The coal and iron trades are better employed, but prices are too low for profitable work. The works in connection with the tunnel under the Mersey are progressing fast, and the headings from each side of the river will meet before long. The proposed extension of the Craven Arms and Bishop's Castle Railway to Montgomery station on the Cambrian line is unfortunately said to be meeting with a powerful landed opposition.

## UTILISATION OF FURNACE SLAGS.

An improved method for the production of pure phosphate of lime and for extracting and utilising the phosphoric acid contained in several metallurgical slags, especially in those obtained by treating phosphoric pig in the basic, Bessemer, and Siemens' process has been invented by Mr. T. Twynam, of Hampstead. The phosphoric slag is ground preferably, after having been first broken up by being thrown into water whilst hot. Any shots of metallic iron may then be separated by means of magnets. The ground slag is treated in a suitable tank with hydrochloric acid, preferably in the cold, in sufficient quantity to dissolve out all the phosphoric acid which the slag contains. The strength of the hydraulic acid may be varied with advantage, according as it is desired to produce chiefly phosphoric acid or phosphate of lime. In the former case, acid, of the ordinary strength of commerce (30 per cent.) or thereabouts may be advantageously employed, in the latter case he always prefers to use an acid of a less strength, from 5 to 10 per cent. strength he finds to give good results as it leaves the bulk of the iron insoluble. In order to keep as much iron as possible out of the solution the ground slag may be first roasted in a current of air before being treated with the weak acid so as to convert the ferrous oxide into ferric oxide as proposed by Mr. S. G. Thomas in 1878; but this preliminary roasting is not essential. As sulphuretted hydrogen gas is given off when the slag is dissolving the tank should be covered and connected with a flue.

When the digestion with acid is complete the solution is run off from the insoluble residue, which residue when weak acid has been used, contains a considerable percentage of oxide of iron together with some oxide of manganese and gelatinous and undissolved silica, and forms a valuable material in some metallurgical operations. The ferrous oxide contained in the solution is oxidised into the ferric state by any of the known means of oxidation, chlorine gas being the oxidant most conveniently employed, either by passing the gas into the solution or by adding manganese dioxide and some free hydrochloric acid to the solution. Air may also be used as an oxidant by forcing it through the solution, though he does not find it so efficacious as chlorine. He has also found it very convenient for the purpose of oxidising the ferrous oxide contained in the slag to roast it in a current of air in a reverberatory or other calciner, or to blow air or air and steam through the molten slag.

The ferric oxide in solution is then precipitated in combination with part of the phosphoric acid as ferric phosphate, by carefully adding carbonate of lime to the somewhat acid solution. The amount of carbonate required varies according to the amount of free acid in the solution, and according to the amount of ferric oxide present, it should be added in powder and kept well agitated in the solution. When the ferric oxide is nearly all precipitated the carbonate should be added more gradually, care being taken to avoid as far as possible any excess otherwise than ferric phosphate precipitated will contain also phosphate of lime; the precipitation should be performed in the cold, or at most a gentle heat. The precipitate of ferric phosphate having been separated from the solution containing phosphate of lime is washed and dried, and may then be utilised to recover the phosphoric acid contained in it by the process patented by Mr. Thomas and himself early in the present year—it is treated with sufficient strong sulphuric acid to cause the formation of free phosphoric acid and sulphate of iron, which is insoluble in the excess of sulphuric acid employed, the mixed solution of phosphoric and sulphuric acids is then utilised in one of the ways described. He prefers, however, to use it in the treatment of the phosphate of lime subsequently obtained from the solution filtered from the ferric phosphate.

The phosphoric acid remaining in the solution separated from the ferric phosphate is precipitated by lime or chalk as a phosphate of lime, or if there was much magnesia in the slag as a mixed phosphate of lime and magnesia; in place of ordinary lime or chalk dolomitic lime or dolomite may be employed. The precipitation by chalk is not so readily accomplished as when lime is employed, the powdered chalk should be kept well agitated, and the solution heated. The phosphate of lime may be obtained either in the bibasic or tribasic state, according to the amount of the precipitant employed in either case it should be well washed to free it from calcium chloride. If there be any magnesia left in solution it may afterwards be precipitated by digesting the solution with lime or dolomitic lime, or the magnesia may be thrown down with the phosphate of lime, as it forms a valuable manuring agent. Sometimes especially when the amount of ferrous oxide is not large he precipitates all the ferric oxide present as ferric phosphate by means of chalk, but without previous oxidation of the ferrous oxide present in solution, and then precipitate the phosphate of lime, preferably by chalk, keeping the solution as far as possible from the air to prevent oxidation of the ferrous oxide.

## PROVINCIAL STOCK AND SHARE MARKETS.

Cornish Mine Share Market.—Mr. S. J. Davey, mine sharedealer, Redruth (Oct. 18), writes:—Our market has been most excited this week about West Frances shares; prices advanced from 40s. on Saturday morning to 9½ by Monday evening. Business in other mines has been slow all the week. To-day market is inactive. West Frances, 6¼ to 6¾. Subjoined are the closing quotations:—Blue Hills, ¼ to ⅜; Carn Brea, 4⅛ to 4⅛; Cook's Kitchen, 17 to 19; Dolcoath, 64½ to 65; East Pool, 39¾ to 40¼; Killifreth, 1½ to 1¾; New Cook's Kitchen, 2 to 3; New Kitty, 1¾ to 2; Pedn-an-drea, ⅛ to ¼; South Condurrow, 8¾ to 8¾; South Penstruthal, 1⅝ to 1⅞; South Crofty, 4½ to 5½; South Frances, 8½ to 9; Tincroft, 6½ to 7; West Basset, 4 to 4½; West Frances, 6¼ to 6¾; West Kitty, 14½ to 14¾; West Peevor, 2 to 3; West Polbrean, ¾ to 1; West Poldice, ¾ to 1; West Seton, 7¾ to 8¼; Wheal Agar, 13¼ to 13¾; Wheal Basset, 3½ to 4; Wheal Grenville, 6 to 6¼; Wheal Peevor, 2½ to 3½; Wheal Kitty, 1 to 1¼; Wheal Uny, 1¼ to 1¾; Wheal Coates, ¼ to ⅜; West Tolgus 8 to 10; Trevaunance, 2½ to 3; South Tolcarne, 4½ to 5.

— Messrs. Abbott and Wickett, stock and share brokers, Redruth (Oct. 15), write:—There has been a large business in West Frances shares this week, in consequence of an improvement in the 174 fm. level, and the price advanced from 1¾ to 9½, closing at 6¾. Not much doing in other shares. Closing quotations herewith:—Blue Hills, ⅛ to ⅜; Camborne Vean, ⅜ to ¼; Carn Brea, 4½ to 5; Cook's Kitchen, 18 to 19; Dolcoath, 64½ to 65; East Pool, 40 to 40¾; Killifreth, 1½ to 1¾; New Cook's Kitchen, 3 to 4; New Kitty, 1⅞ to 2; South Condurrow, 8¾ to 8¾; South Crofty, 5 to 7; South Wheal Frances, 8½ to 9; Tincroft, 6½ to 7; West Basset, 4 to 4¼; West Kitty, 14½ to 14¾; West Peevor, 2 to 3; West Frances, 6 to 6½; West Tolgus, 10 to 12; West Seton, 7½ to 8½; Wheal Agar, 13¼ to 14; Wheal Basset, 3 to 4; Wheal Grenville, 6 to 6¼; Wheal Kitty (St. Agnes), 1 to 1¼; Wheal Peevor, 3 to 4; Wheal Uny, 1 to 1¼.

— Mr. M. W. Bawden, Liskeard (Oct. 18), writes:—The mining market continues dull and inactive; the only exception has been a demand for West Frances shares, which advanced to 10*l.* a share on cutting the flat lode, worth 50*l.* per fathom, but have since receded to 5*l.* sellers. Subjoined are the closing quotations:—Bedford United, 1½ to 1¾; Carn Brea, 4½ to 4¾; Cook's Kitchen, 18 to 18½; Dolcoath, 63 to 63¾; Devon Consols, 2¾ to 2⅞; Devon Great United, ⅜ to ½; East Caradon, ⅛ to ⅜; East Pool, 39 to 39½; Gawton United, ⅛ to ¼; Glasgow Caradon, 1⅜ to 1½; Gunnislake (Clitters), 2 to 2⅜; Herodsfoot, 1s. to 1s. 6d.; Hingston Down, ½ to ¾; Killifreth, 1⅜ to 1½; Marke Valley, ⅜ to ⅜; New West Caradon, ⅜ to ¼; Old Gunnislake, ⅛ to ¼; Owen Vean, 1¾ to 1½; Phœnix United, 2 to 2¼; Prince of Wales, ⅜ to ⅜; South Caradon (Limited), fully paid, 1 to 1⅛; South Condurrow, 8¼ to 8½; South Crofty, 6 to 6¼; South Devon United, ⅜ to ½; South Frances, 8¾ to 9; Tincroft, 6¾ to 7; West Basset, 4¾ to 5; West Caradon, ¼ to ⅜; West Mary Ann, ⅛ to ⅜; West Kitty, 14¼ to 14½; West Crebor, ⅜ to ¼; West Phœnix, ⅛ to ¼; Wheal Agar, 13 to 13¼; Wheal Crebor, 2¼ to 2½; Wheal Grenville, 6 to 6¼; Wheal Hony and Trelawny, 1 to 1⅛; Wheal Kitty, 1 to 1⅛; Wheal Jane, ⅛ to ¼; Wheal Peevor, 3 to 3½; Wheal Uny, 2 to 2½; Wheal Basset, 3¾ to 4; West Frances, 4½ to 5; St. Just United, 4½ to 5.

— Mr. John Carter, mine sharedealer, Camborne (Oct. 18), writes:—A sharp rise has taken place in West Frances from 25s. to 9½ on a discovery in 174 west on the flat lode, valued at 50*l.* per fathom; price is quiet to-day at 6¼ to 6¾. Other shares are without much alteration. Subjoined are the closing quotations:—Carn Brea, 4 to 4½; Cook's Kitchen, 18 to 19; Dolcoath, 64½ to 65; East Pool, 40 to 40½; Killifreth, 1½ to 1⅝; Mellanear, 3 to 3½; New Cook's Kitchen, 2 to 2½; New Kitty, 1¾ to 2; South Condurrow, 8 to 8¼; South Crofty, 4 to 5; South Frances, 8¼ to 8¾; Tincroft, 6½ to 6¾; West Basset, 4¼ to 4¾; West Frances, 6¼ to 6¾; West Kitty, 14¼ to 14¾; West Peevor, 1½ to 2; West Poldice, ½ to 1; West Seton, 7⅛ to 8½; Wheal Agar, 13¼ to 13¾; Wheal Basset, 3½ to 4; Wheal Grenville, 6 to 6¼; Wheal Kitty, 1 to 1¼; Wheal Peevor, 2¾ to 3¼; Wheal Uny, 1¼ to 1½; Penhalls, 4s. to 6s.

Manchester.—Messrs. Joseph R. and W. P. Baines, sharebrokers, Queen's Chambers, Market-street (Oct. 18) write:—Though a moderate amount of general business is in progress, values in the leading home railway securities have shown weakness, and values have had a downward tendency most of the week, induced by some poor traffic returns, the poorness of which is taken to indicate an unhealthy state as regards the trade of the country. Most lines have participated in the depression more or less, even where individual concerns have been influenced favourably from causes special to themselves, the good has been counteracted by the general depression. Mexican Railways have been freely bought, and, compared with last Thursday's figures, quote a rise of 7, at 88¾ to 89, though they have during the week once gone a little over 90. Foreign stocks irregular. Argentine Hard Dollar Bonds are again ⅛ higher, and Spanish and Italians are ⅛ and ⅜ respectively higher. Egyptians of all issues lower. Unified, 1¼; Pref., 1½; and Daira Sanieh, 1⅜. Mexican Three per Cent. ⅛, and Peruvians ⅛ down. Miscellaneous classes quiet, but fairly steady.

Banks tolerably (at any rate, comparatively) brisk at full prices lately marked. Values where changed are all for the better. Consolidated and Lancashire and Yorkshire are both partially changed. In the former, buyers bid 1/16 more, and for the latter sellers' demands are advanced ¼. Manchester and Salford and Oldham Joint-Stock are both ⅛ better.

Insurance shares produced a few dealings, the majority of which are Lancashires. These have been done a few times at slowly receding prices. Thames and Mersey have not changed hands, notwithstanding a reduction in sellers' price of 2/16.—Higher: Maritime, ¼ to 5/16; Sea, 1/16.—Lower: Lancashire, ⅜ to 7/16; Ocean Marine, ¼; London and Liverpool and Globe, ⅛ to ¼; and Reliance Marine, 1/16.

Coal, Iron, &c., and Mining.—Very few transactions are reported, confined to Bolckows, and one solitary marking in Palmer's Shipbuilding, B. The changes of quotations are numerically evenly balanced, but as regards extent of alteration the favourable alterations show best.—Higher: John Browns, 1½; Nant-y-Gio and Blaina, preferred, 1; Staveley Coal, A, ½ to 1; Telegraph Construction and Maintenance, 1; and Great Laxey Lead, ¼.—Lower: Ashbury Railway Carriage, &c., ½; Palmer's, A, ¼; ditto, B, ¼; Llynvi Valley and Tondu, pref., ⅜; Bolckow, 12*l.* paid, ⅛; and Tharsis Sulphur and Copper, 1/16.

Cotton Spinning, &c., shares keep strong for the most part, and better prices rule, but the amount of business doing is not great.—Telegraphs little doing, and generally better.—Telephones very quiet, and only change in values is a decline of 3*d.* in Lancashire and Cheshire.

Miscellaneous dull, and few variations worth chronicling. Barlow and Jones are distinctly better, and a good demand has set in for Bradbury Sewing Machine shares at much better prices.

Railways.—Adverse changes are the rule, the pressure to sell "heavy" lines being greatest to-day, although from there is a slight recovery from the lowest. The decline is attributable to poor traffics, auguring bad trade. Scotch lines were fairly supported, but could not withstand sympathetic depression, and Metropolitan and Metropolitan Districts, though assisted by exceptional causes, had also to give way. Southern lines, though showing improvement, are decidedly under best points. Canadian, after rallying, and some hopeful views being entertained, have again relapsed on rumours of financial disasters, and expressed opinions that "knowing ones" were getting out, followed by to-day's poor traffic (total increase 5654*l.*), resulting in a considerable reduction in all issues. At the close this evening, however, the feeling was fairly firm at slight rebound. Americans lack support, and quote lower almost throughout.

## SCOTCH MINING AND INDUSTRIAL COMPANIES SHARE MARKETS.

Stirling.—Mr. J. Grant Maclean, stockbroker and ironbroker (Oct. 18), writes:—During the past week the settlement has been concluded satisfactorily, but business continues restricted owing to fears of commercial failures and the unsettled state of the labour market. The cheapness of money seems still ineffective to bring about a recovery.

In shares of coal, iron, and steel companies, prices are generally easier. Cardiff and Swansea, 45s. to 55s.; Chillington, 20s. to 25s.; Llynvi and Tondu, 67s. 6d. to 72s. 6d. Marbellas have declined from 74s. to 70s. 6d. New Shariston, Pref., 6¼ to 6⅛.

In shares of foreign copper and lead concerns business has been very quiet. Tharsis are steady at 6*l.* 10s. 6d. to 6*l.* 12s. 6d. Arizonas have improved from 36s. to 41s.; Bratsbergs, 51s. 3d. to 53s. 7d.; Lake Superior, 2s. 6d. dis. to 2s. 6d. prem.; Pierrefitte, 16s. to 18s.; Senteins, 4s. to 6s.; Souback and Catir Alan, 5s. to 10s.; and Yorke Peninsula, Preference, 10s. to 12s. 6d.

In shares of home mines business is dull. Coed-y-Fedw are at 20s. to 25s.; East Devon Consols, 7s.; Great Holway, 60s. to 80s.; Gunnislake (Clitters), 40s. to 45s.; Gorsedd and Merllyn, 20s. to 30s.; Goginan, 6s. to 8s.; Llandegla, 2s. 6d. to 5s.; Mounts Bays, 4s. 6d. to 5s. 6d.; New Caradon, 5s. 3d.; North Grogwinion, 2s. 6d. to 5s.; Parys, 2s. to 4s.; Rhosesmors, 35s. to 40s.; South Condurrow, 8¼ to 8½; Tamar, 10s. to 12s. 6d.; Trevaunance, 50s. to 60s.; Trebartha Lemarne, 2s. to 4s.; Tankerville, 2s. to 3s.; West Devons, 5s. to 10s.; West Holway, 10s. to 12s. 6d.; Wheal Lusky, 1s. to 3s.; Wheal Silver and Llanteglos, 25s. to 30s.

In shares of gold and silver mines prices are steady. Richmonds are firmer at 6 to 6¼; Montanas have advanced to 40s., 45s., owing to the capital which was not subscribed having all been taken up. Akankoos are 4s. to 6s.; Callao Bis, 7s. 6d. to 8s. 9d.; California, 16s. to 18s.; Cankim Bamoo, 5s. to 7s. 6d.; Colar, 1s. 3d.; Colombian Hydraulic, 4s. to 6s.; Denver, 1s. to 3s.; Devala Central, 1s. to 1s. 6d.; Eberhardts, 4s. to 6s.; Guinea Coast, 2s. 6d. to 5s.; Great Zaruma, 7s. 6d. to 12s. 6d.; Isabelle, 7s. 6d. to 10s.; Javali, 2s. to 3s.; Kapangas, 2s. 6d. to 3s. 6d.; Kohinoors, 8s. to 10s.; Mysore, 2s. to 3s.; New Callao, 6s. to 8s.; New Emma, 30s. to 35s.; Port Phillip, 1s. 3d. to 2s. 6d.; Potosi, 6s. to 8s.; Rhodes Reef, 2s. 6d. to 3s. 9d.; Rio Grande Do Sul, A, 4s.; South-East Wynaad, 1s. 6d. to 2s. 6d.; Victoria, 10s. 6d. to 11s. 6d.; West Callao, 7s. 6d. to 12s. 6d.; and Yuba River, 5s. to 10s.

In shares of oil and miscellaneous prices are generally lower. In oil shares Burntisland have declined from 24¾ to 23¾; Lanark from 87s. to 68s. 6d.; and West Lothian, par to 2s. 6d. prem.; Home Mines Trust, 12s. to 14s.; Lawes' Chemicals, 5⅞ to 6; Odams Chemicals wanted at 9; Phospho-Guano, 90s. to 100s.

Edinburgh.—Messrs. Thos. Miller and Sons, stock and share brokers, Princes-street (Oct. 17), write:—The tendency of Scotch railway stocks has been upward during the past week, North British and Highland each showing a rise. The first has absorbed the greatest share of attention, and has risen most. Preference stocks in a number of instances show a fair advance. Canadians have tended downwards. A large business has been done in oil shares, which have receded. Arizona Copper shares have received a large share of attention, and the price has advanced. To-day the railway market has gone flat. During the week Caledonian has fallen from 104¼ to 104; Great North of Scotland from 57½ to 56; North British has advanced from 103½ to 103⅝; Highland from 94 to 95¼. British Linen Bank stock has risen from 296 to 296½; National Bank has receded from 314 to 313. Ceylon Investment Association shares have fallen from 17s. 6d. to 10s.; Scottish American Mortgage from 63s. to 62s.; Missouri Land and Live Stock have declined from 79s. to 78s. 6d.; Prairie Cattle Second Issue have 7⅞ to 6⅝, and the Third from 8 to 8⅝; Western Ranches from 93s. to 100s.; Arizonas show a rise from 25s. 6d. to 40s. Broxburn Oil have fallen from 29½ to 28¾; Burntisland Oil from 24½ to 23¾; Clippen's Oil from 18⅞ o 17⅝; Lanark from 87s. to 69s. 6d.; Midlothian from 11 13/16 to 10 15/16; Youngs from 1¼ to 1 11 13/16.

## IRISH MINING AND MISCELLANEOUS COMPANIES SHARE MARKET.

Cork.—Messrs. J. H. Carroll and Sons, stock and share brokers, South Mall (Oct. 17), write:—The markets were steady to-day, and Great Southerns changed hands at 119, Midlands were also done at 83, and Bandons asked for at 85. Macrooms offered at 6, National Banks steady at 24⅛ to 25; and Munsters at 6 15-16ths. Hibernians were done at 26⅜, and Provincials at 31½. No change in Alliance Gas. Cork Gas are 7 to 7⅛. Cork Steam Packets about 12; Lyons 5*l.* shares remain 6 7-16ths, and Gouldings 8 15-16ths. Brewerys are sellers at 5, and the Debentures at 98. Dalys also offered at last price, and Gresham Hotels asked for, at 3½.

## THE COPPER TRADE.

Messrs. Harrington, Horan, and Co. (Liverpool, Oct. 15).—Chili copper charters for the second half of September were advised on the 1st instant as 1200 tons, of which 100 tons bars and ingots, with 350 tons furnace material for England, and 750 tons bars and ingots for the Continent. Charters for the first half of this month are not yet to hand. During the past fortnight we have had a dull market, and only moderate sales have taken place from 63*l.* 7s. 6d. down to 60*l.* 17s. 6d. spot, and 63*l.* 17s. 6d. down to 61*l.* 10s. forward. The tone to-day is steadier with buyers of spot up to 61*l.* 10s., and no sellers. The sales of furnace material comprise—At Liverpool: 46 tons Peruvian ore at 12s. 6d., 86 tons Italian ore (low produce) at 11s., and 20 tons Mexican ore to arrive at 12s. 3d.—At Swansea: 246 tons Bolivian ore and 448 tons Bolivian regulus, ex Tocopilla, at 12s. 3d. and 12s. 6d. per unit respectively, 334 tons Ruby Quebrada ore at 11s. 10½d., and 500 tons yellow Quebrada ore at 11s. 6d., 250 tons Norwegian ore (good produce) to arrive at 12s. 3d.—Precipitate: 25 tons English at 12s. 9d., 20 tons Mason's Spanish at 12s. 3d., 100 tons Rio Tinto precipitate (ordinary No. 1) at 12s. 6d., and 150 tons (best) at 12s. 9d. per unit. Import of Chili copper during the past fortnight 1405 tons fine, against 2868 tons fine same time last year; delivery 1179 tons fine, against 2223 tons fine. Import of other copper during the past fortnight 743 tons fine, against 1363 tons fine same time last year; delivery 890 tons fine, against 1361 tons fine. Arrivals here during the fortnight of West Coast S.A. produce:—Lord Marmion, from Lota, 725 tons bars; Aconcagua (s), from Valparaiso, &c., 335 tons bars, 275 tons ingots; Eden, from San Antonio, 8 tons bars. At Swansea: Nil. Stocks of copper (Chilian and Bolivian) in first and second hands, likely to be available, we estimate at—

| | Ores. | Regulus. | Bars. | Ingots. | Barilla. |
|---|---|---|---|---|---|
| Liverpool | — | 570 | 19,152 | 711 | — |
| Swansea | — | 3,573 | 6,306 | — | — |
| Total | — | 4,143 | 25,458 | 711 | — |

Representing about 28,032 tons fine copper, against 27,806 tons Sept. 29; against 23,205 tons Oct. 14, 1882; 28,425 tons Oct. 14, 1881; 33,032 tons Oct. 15, 1880. Stock of copper contained in other foreign ore and Spanish precipitate, 4286 tons fine, against 1933 tons Oct. 14, 1882. Stock of Chili bars and ingots in Havre, 1550 tons fine, against 2569 tons Oct. 14, 1882. Stock of Coro Coro Barilla in Havre, — tons, against 30 tons Oct. 14, 1882. Stock of copper other than Chili in Havre, 360 tons fine, against 260 tons Oct. 14, 1882. Stock of Chili copper afloat and chartered for to date, 9577 tons fine, against 8950 tons Oct. 14, 1882. Stock of foreign copper in London, chiefly Australian, 3700 tons fine, against 6300 tons Oct. 14, 1882.

According to the Board of Trade Returns the total imports and exports into and from this country for the first nine months of the following years were:—

| Imports. | 1881. | 1882. | 1883. |
|---|---|---|---|
| Copper in ores ..... Tons | 9,982 | 10,133 | 10,517 |
| Copper regulus and precipitate | 20,891 | 20,262 | 26,242 |
| Bars, cakes, and ingots | 23,445 | 25,951 | 26,531 |
| In pyrites, estimated | 10,699 | 12,125 | 11,983 |
| Total | 65,017 | 68,471 | 75,273 |
| **Exports.** | | | |
| English copper—wrought & unwrought .. Tons | 25,455 | 21,252 | 23,747 |
| Foreign copper—unwrought | 11,156 | 9,121 | 8,907 |
| Yellow metal | 11,545 | 13,975 | 14,732 |
| Total | 48,156 | 44,348 | 47,386 |

Mechanical Progress in Coventry.—The high reputation Coventry has acquired in connection with the manufacture of some of the more delicate kinds of machinery—bicycles and tricycles—has become almost proverbial, and the series of illustrated catalogues just issued by Messrs. Hill and Morton, Trafalgar Works, Coventry, go far to show that this reputation is not undeserved. Among the latest novelties introduced by the firm is the Arion tricycle, which they explain is fitted with an improved double-driving apparatus, acknowledged by eminent judges to be the most perfect double-driver yet introduced. It has been designed with the greatest care, and there is not a single part in its mechanism which has not received most careful forethought, and is so skilfully and accurately fitted as to combine freeness in propulsion with great stability, while the rider's general comfort in every way has received the utmost consideration. Both the Cycle and the Perambulator catalogues are worth consulting before deciding what choice to make. Messrs. Hill and Morton have also a price list of patent hammerless breechloading and other guns, revolvers, and pistols; in this they illustrate the leading guns in the field both at home and abroad. Some of the designs are unusually attractive, whilst the prices have so wide a range than it can scarcely be supposed that any purchaser will find difficulty in suiting his taste and means. In this connection reference may also be made to the illustrated price-list of high-class watches, clocks, and jewellery manufactured by the Chronograph Watch and Jewellery Company, of Hill Cross, Coventry. It would, of course, be impracticable to refer to all the various pieces of mechanism and jewellery illustrated in this catalogue, but one or two of the leading articles may be mentioned. The company's specialité appears to be their patent chronograph centre seconds stop-watch, which is claimed to be the most complete watch ever offered to the public, for by the use of machinery in its construction the mechanism is most accurate. It is the most precise time measurer yet invented, and is invaluble to sportsmen and scientists for marking the exact time occupied in rapid performances, or testing the speed of machinery. The seconds in the watch works in front, and denotes time to the fifth part of a second. By merely pressing the hinge at the top the centre seconds is immediately stopped or started as desired. Of the jewellery and clock designs generally it may be said that they are in good taste and great variety.

## FOREIGN MINING AND METALLURGY.

The condition of the French Iron Trade appears to be improving. A meeting of forgemasters just held at Maubenge has decided to carry the price of iron to 6*l.* 16s. per ton full at Paris. Under these circumstances Parisian ironmasters have been compelled to advance their rates to 7*l.* 4s. per ton; but it is not expected that the rise will be carried further. Orders are looked for from the great French railway companies, but they are not being given out so freely as was expected. The administrations of the various systems appear, indeed, disposed to restrict their outlay as much as possible. In the Longwy group some large orders for pig have been given out—for no less than 70,000 to 80,000 tons—so that two-thirds of the production of 1884 are already engaged. Under these circumstances prices have advanced from 2*l.* 5s. to 2*l.* 6s. per ton. The situation appears less favourable in the centre than in the Nord, sundry works having been closed in consequence of a want of orders. The closing of these works has, as a natural consequence, led to a suspension of working operations at a few of the collieries. A slight improvement seems to have taken place in the German iron trade, pig especially appears to be in more demand, and bars are not so neglected as they were a month since. Fresh orders have arrived at the steelworks, and some rather important adjudications have also taken place. At Elberfeld the Administration of the State Railways has let contracts for 8600 tons of metallic sleepers, which have been shared between the Bochum, the Gute Hoffnung, the Union, the Dortmund, and the Hœrde, and the Phœnix Works, at prices ranging from 6*l.* 7s. 5d. to 6*l.* 12s. per ton. The Bochum Works have taken three lots of steel rails of 850 tons, 1000 tons, and 750 tons respectively, at 7*l.* 2s. per ton; and the Rhine Steelworks 1500 tons at 7*l.* 2s. per ton. The production of Bessemer pig in Germany in August this year is returned at 41,542 tons, as compared with 38,844 tons in July. The production of all descriptions of pig in Germany in August was 281,458 tons, as compared with 271,446 tons in August, 1882.

Nothing has occurred to improve the aspect of affairs in the Belgian Iron Trade during the past week, and there do not appear to be any immediate symptoms of a favourable change. Some current orders continue to come to hand, but they have not been sufficient to impart any activity to the works. So long as the present rates prevail for raw materials it will not be possible to reduce prices for iron or plates; and, on the other hand, until orders become more numerous than they are it will not be possible to advance quotations. Everything, then, turns on the course taken by buyers and the producers of raw materials. English casting pig remains at 2*l.* 5s. 5d. per ton, while Charleroi pig has supported a quotation of 2*l.* 16s. per ton. Athus-Halanzy pig remains a little below the level of English competition. Charleroi refining pig has been held with some firmness at 2*l.* 4s. per ton. The Grand Duchy of Luxembourg having disposed of its stocks to a considerable extent in Germany maintains its prices with some firmness at 1*l.* 16s. per ton, and as its production is partially engaged until the close of March, 1884, it may possibly carry its terms somewhat higher. Iron has not been held with any increased firmness upon the Belgian markets; the basis prices has remained at 5*l.* per ton. No. 2 has been in no great request at 5*l.* 8s. per ton. There has been less enquiry for No. 3 at 5*l.* 16s. per ton. The market for plates has been relatively rather more encouraging. Business has been done in No. 2 at 6*l.* 16s. per ton, and in No. 3 at 7*l.* 13s. per ton. Plates of commerce have made 9*l.* 4s. per tan. The Meuse Construction Workshops Company has received an order for the material required for the water supply of Oporto. This is a rather important affair—a little more than 500,000*l.* It was necessary to lift the waters of the Souza, an affluent of the Douro, and the problem has been solved in a very happy manner by a system of turbines and pumps.

The general tone of the Belgian Coal Trade has been firm, except, perhaps, as regards coal for industrial purposes. The approach of the winter has increased the demand for household coal; while the ironworks, without taking any very large quantities, still maintain nearly an average consumption. As regards coke and coking coal there appears to be little chance of an advance in it for some time to come, German coke having acquired a very good footing in the Longwy basin. The state of the German coal trade appears very good, although the deliveries from the basin of the Ruhr, in the second half of September, only amounted to 943,680 tons, as compared with 1,003,490 tons in the corresponding period of 1882. The deliveries of German coal to Hamburg and the surrounding district amounted in September to 42,470 tons, as compared with 40,520 tons in September, 1882. The deliveries of German coal to Holland appear to be increasing. In 1881 Holland imported 3,560,909 tons of coal, of which 209,157 tons came from Belgium, 450,803 tons from England, and 2,822,949 tons from Germany. In 1880 the corresponding imports were 3,527,160 tons, of which 230,447 tons came from Belgium, 507,522 tons from England, and 2,789,191 tons from Germany. It will be seen that Germany figured in the imports of coal into Holland in 1881 for 81 per cent., while the corresponding imports from England and Belgium amounted to only 19 per cent. The extraction of the Belle Bouche Colliery Company (Belgium) for the first half of 1883 amounted to 83,469 tons. The sales effected during the same period were 74,026 tons, leaving a stock of 15,532 tons of coal in hand at the close of June, 1883.

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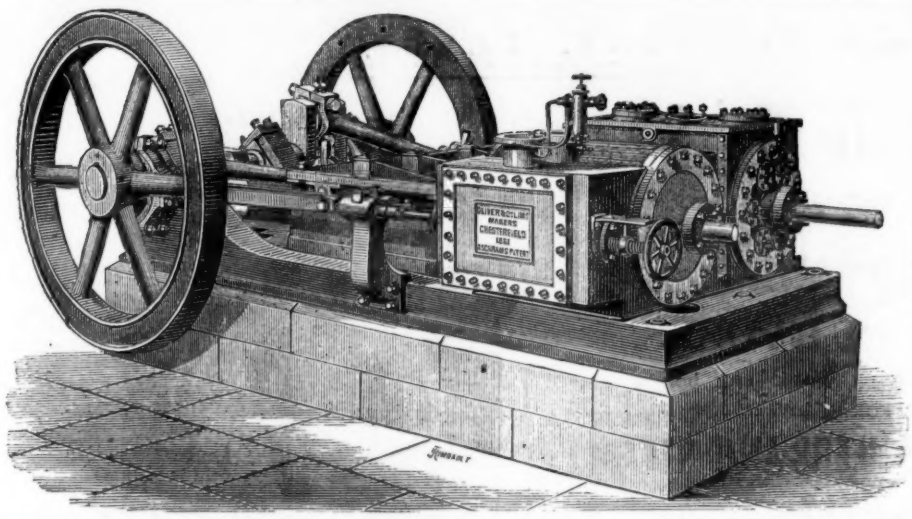

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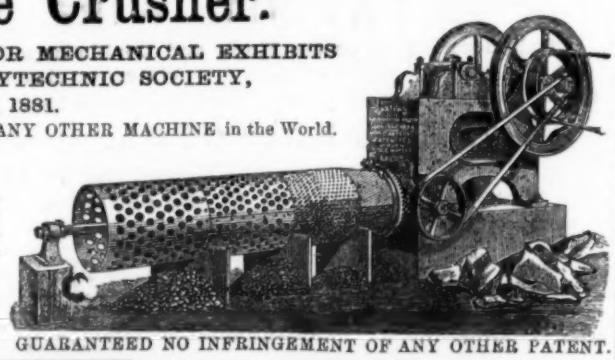

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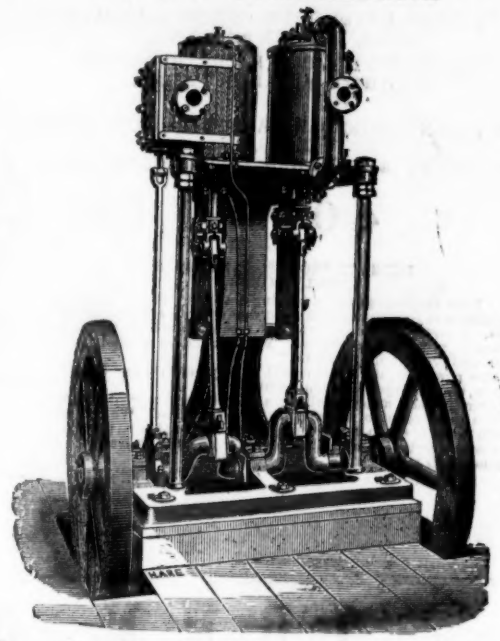

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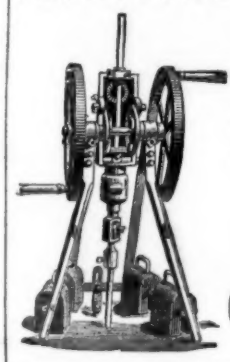

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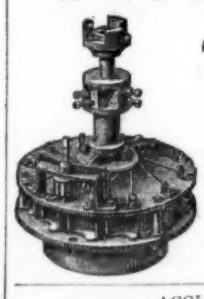

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